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Guidance for the Reregistration of Pesticide Products Containing Pentachloronitrobenzene (PCNB) as the Active Ingredient

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Office of
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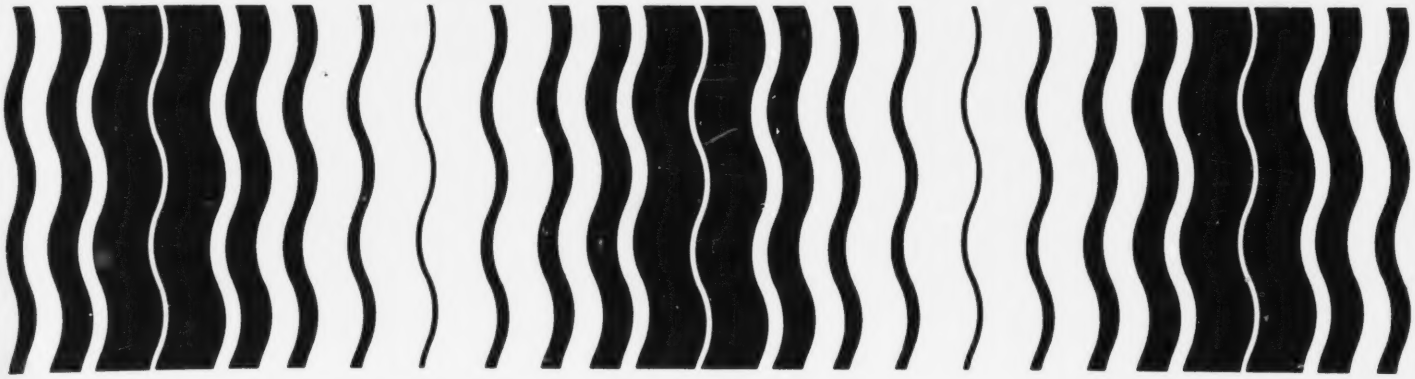
Pesticides

EPA

Guidance for the Reregistration of Pesticide Products Containing PCNB as the Active Ingredient



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GUIDANCE FOR THE REREGISTRATION OF PESTICIDE PRODUCTS CONTAINING

PENTACHLORONITROBENZENE (PCNB)

AS THE ACTIVE INGREDIENT

CHEMICAL CODE: (056502)
CAS NUMBER: 82-68-8
CASE NUMBER: 0128

JANUARY, 1987

ENVIRONMENTAL PROTECTION AGENCY

OFFICE OF PESTICIDE PROGRAMS

WASHINGTON, D.C. 20460

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GLOSSARY/ACRONYMS

1. The Agency: U.S. Environmental Protection Agency/EPA
2. A.I.: Active pesticide ingredient
3. DCI: Data Call-In Notice
4. EPs: End-Use pesticide products
5. EUP: Experimental Use Permit
6. FDA: U.S. Food & Drug Administration
7. FIFRA: Federal Insecticide, Fungicide, Rodenticide Act (As amended)
8. 40 CFR: Title 40, Code of Federal Regulations
9. Interim tolerance: A temporary tolerance which is established until such time as a registrant fulfills all of the residue data requirements for his/her pesticide product(s).
10. MPs: Manufacturing-Use pesticide products
11. NPDES Permit: National Pollutant Discharge Elimination System permit
12. OES: Office of Endangered Species, U.S. Dept. of the Interior
13. PADI: Interim acceptable daily intake of a chemical in mg/kg/day by a 60 kg person.
14. RAC's: Raw agricultural commodities

I. INTRODUCTION

EPA has established the Registration Standards program in order to provide an orderly mechanism by which pesticide products containing the same active ingredient can be reviewed and standards set for compliance with FIFRA. The standards are applicable to reregistration and future applications for registration of products containing the same active ingredient. Each registrant of a product containing an active ingredient subject to this Standard who wishes to continue to sell or distribute that product must bring his product and labeling into compliance with FIFRA, as instructed by this Standard. Pesticides have been grouped into use clusters and will be reviewed on the basis of a ranking scheme giving higher priority to (1) pesticides in clusters used on food and feed crops; and (2) pesticides produced in large volumes.

The Registration Standards program involves a thorough review of the scientific data base underlying a pesticide's registration. The purpose of the Agency's review is to reassess the potential hazards arising from the currently registered uses of the pesticide; to determine the need for additional data on health and environmental effects; and to determine whether the pesticide meets the "no unreasonable adverse effects" criteria of FIFRA. In its review EPA identifies:

1. Studies that are acceptable to support the data requirements for the currently registered uses of the pesticide.

2. Additional studies necessary to support continued registration. The additional studies may not have been required when the product was initially registered or may be needed to replace studies that are now considered inadequate.

3. Labeling revisions needed to ensure that the product is not misbranded and that the labeling is adequate to protect man and the environment.

The detailed scientific review, which is not contained in this document, but is available upon request[1], focuses on the pesticide active ingredient. The scientific review primarily discusses the Agency's evaluation of and conclusions from available data in its files pertaining to the pesticide active ingredient. However, during the review of these data the Agency is also looking for potential hazards that may be associated with the end use products that contain the active ingredient. The Agency will apply the provisions of this Registration Standard to end use products if necessary to protect man and the environment.

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[1] The scientific reviews may be requested from the Information Services Section, Program Management and Support Division (TS-757C), EPA, Room 236, Crystal Mall #2, 1921 Jefferson Davis Highway, Arlington, Virginia, 22202 (Telephone (703) 557-4453). In addition, reviews may be purchased from the National Technical Information Services, 5285 Port Royal Road, Springfield, Virginia 22161, approximately 90 days after issuance of a Standard.

EPA's reassessment results in the development of a regulatory position, contained in this Registration Standard, on the pesticide and each of its registered uses. See Section IV - Regulatory Position and Rationale. Based on its regulatory position, the Agency may prescribe a variety of steps to be taken by registrants to maintain their registrations in compliance with FIFRA. These steps may include:

1. Submission of data in support of product registration;

2. Modification of product labels;

3. Modifications to the manufacturing process of the pesticide to reduce the levels of impurities or contaminants;

4. Restriction of the use of the pesticide to certified applicators or other specially trained individuals;

5. Modification of uses or formulation types; or

6. Specification of packaging limitations.

Failure to comply with these requirements may result in the issuance of a Notice of Intent to Cancel or a Notice of Intent to Suspend (in the case of failure to submit data).

In addition, in cases in which hazards to man or the environment are identified, the Agency may initiate a special review of the pesticide in accordance with 40 CFR Part 154 to examine in depth the risks and benefits of use of the pesticide. If the Agency determines that the risks of the pesticide's use outweigh the benefits of use, the Agency may propose additional regulatory actions, such as cancellation of uses of the pesticide which have been determined to cause unreasonable adverse effects on the environment.

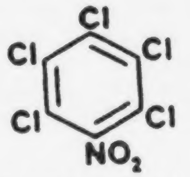
EPA has authority under the Data Call-In (DCI) provisions of FIFRA sec. 3(c)(2)(B) to require that registrants submit data to answer our questions regarding the chemical, toxicological, and environmental characteristics and fate of a pesticide. This Registration Standard lists the data EPA believes are necessary to resolve our concerns about this pesticide. These data are listed in the Tables A, B, and C in Appendix I. Failure to comply with the DCI requirements enumerated in this Registration Standard may result in issuance by EPA of a Notice of Intent to Suspend the affected product registrations.

Registrants are reminded that FIFRA sec. 6(a)(2) requires them to submit factual information concerning possible unreasonable adverse effects of a pesticide at any time that they become aware of such information. Registrants should notify the Agency of any information, including interim or preliminary results of studies, if those results suggest possible adverse effects on man or the environment. This requirement continues as long as the products are registered by the Agency.

II. CHEMICAL COVERED BY THIS STANDARD

A. Description of chemical

The following chemical is covered by this Registration Standard:



Common name:	PCNB
Chemical name:	Pentachloronitrobenzene
CAS Number:	82-68-8
OPP (Shaughnessy) Number:	056502
Empirical Formula:	$C_6Cl_5NO_2$
Trade names:	Avicol®, Botrilex®, Brassicol®, Earthcide®, Folosan®, HOE 0 26014, Kobu®, Kobutol®, Pentagen®, Sanidor 30, Terraclor®, Tilcarex®, Tri-PCNB, and Tritisan®.
Year of Initial Registration:	1964
Registrants of Technical Products:	Aceto Chemical Co, Amvac Chemical Corp., Uniroyal Chemical, Monsanto Chemical Co, Quimica Organica de Mexico.

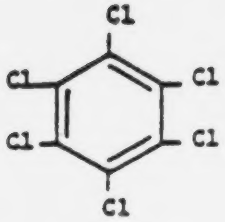
Description of physical characteristics of chemical:

PCNB is a pale yellow to cream crystalline solid at room temperature, its melting point is 141-145° C, boiling point is 328° C, and its molecular weight is 295.3. Its water solubility is 0.44 mg/liter at 20° C.

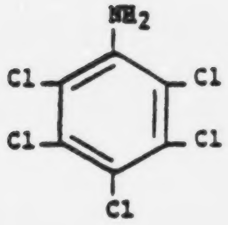
Figure 1 presents the chemical structures of PCNB impurities and various PCNB metabolites.

B. Use Profile

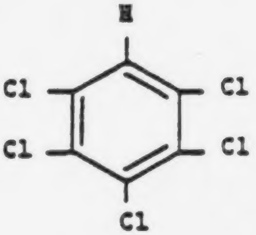
Type of Pesticide:	Non-systemic fungicide for soil and seed treatment.
Pests Controlled:	Plant diseases.
Registered Uses:	Field crops, vegetables, turf, ornamentals, seed treatment.
Predominant Use(s):	Cotton, turf, cabbage, seed treatments, peanuts.
Mode of Activity:	Strong suppression of growth of plant pathogenic fungi
Single active ingredient (a.i.) formulations:	A 75% wettable powder, an emulsifiable concentrate (23.4 - 26.5% a.i.), granulars (2 - 30% a.i.), a flowable (20% a.i.) & a liquid (24% a.i.). Two dust formulations (10 & 20%) for certain planter box uses; 80 & 90% dust for manufacturing use. Technical grade PCNB available at 95 to 99% a.i.
Method(s) of Application:	Primarily applied as spray or granular preparations to soil.



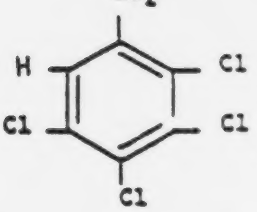
hexachlorobenzene
(HCB)



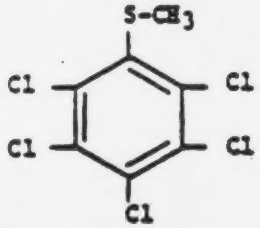
2,3,4,5,6-pentachloroaniline
(PCA)



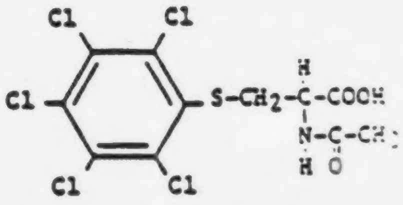
2,3,4,5,6-pentachlorobenzene
(PCB)



2,3,4,5-tetrachloronitrobenzene
(2,3,4,5-TCNB)



S-methyl pentachlorophenyl sulfide
(MPCPS)



N-acetyl-S-pentachlorophenyl-L-cysteine

Figure 1. Chemical structures of PCNB impurities and various PCNB metabolites

C. Regulatory History

Pentachloronitrobenzene (PCNB) is a non-systemic fungicide primarily used to treat soil, seed, transplanted seedlings and turf.

A Special Review (formerly known as Rebuttable Presumption Against Registration [RPAR] process) of products containing PCNB was initiated by the Agency on October 20, 1977 (42 FR 56072). The Special Review was initiated based on the oncogenic potential of PCNB, and the Agency subsequently included hexachlorobenzene (HCB), a major contaminant of PCNB, in its consideration of the fungicide's oncogenic potential in mice.

During the Special Review process, the Agency discussed with the PCNB registrants various exposure and risk reduction measures. As a result of these discussions several risk reduction measures were identified and the registrants agreed to implement these measures.

The Agency agreed to terminate the Special Review on the condition that the risk reduction measures identified were implemented. All PCNB registrants agreed to implement the following: (1) to reduce the level of HCB contaminant to 0.5% by April 1983, and to 0.1% or less by April 1988, in technical grade PCNB (a progress report was to be submitted at the end of each year summarizing efforts to implement HCB reduction technology); (2) to perform a residue study on processed potatoes; (3) to voluntarily cancel the registrations of all end-use products containing dust-based formulations with the exception of those used as planter box seed treatments; (4) to submit data showing that remaining dust based formulations for which there currently are no alternatives, and all wettable powder formulations have been modified in such a way that the formulations *per se*, packaging of the formulations, and/or the use pattern will not result in unreasonable adverse effects to the pesticide applicator; (5) to submit a worker exposure study to demonstrate reduced exposure to PCNB; and, (6) to amend labels to include directions that would reduce exposure to humans.

On April 28, 1982, a Notice of Determination Concluding the Special Review of PCNB (47 FR 18177) was published. The Notice announced the Agency's regulatory decision on PCNB and the risk reduction measures outlined above. The Agency's position on PCNB was that the available evidence did not clearly establish a correlation between exposure to PCNB itself and oncogenicity. With regard to the contaminant, HCB, the Agency described HCB as an animal carcinogen that appeared likely to be responsible for any potential oncogenic effect of commercial PCNB, and the Agency concluded that reducing the level of this impurity in PCNB would be essential to reducing any potential risks posed by PCNB products.

This decision was challenged in a lawsuit by the Natural Resources Defense Council, Inc., (NRDC) for the following reasons: the lack of discussion in the Notice announcing the termination of the Special Reivew on PCNB to support the safety of the contaminant HCB at the present 0.5 percent level; and, that no numerical risk assessments were completed for PCNB and HCB in the Agency's Notice and the teratogenic and mutagenic potential of PCNB and HCB. Subsequently, a settlement agreement was reached with NRDC by which the Agency agreed to reassess its regulatory decisions regarding PCNB by December 31, 1986.

On May 8, 1985 the Agency issued a PCNB Data Call-In Notice in which the registrants of PCNB products were required to submit the following: (1) a description of the new manufacturing technology to attain the HCB level in PCNB to 0.5 percent; (2) an annual progress report summarizing their efforts to attain HCB reduction to 0.1%; (3) a residue study of PCNB and HCB levels in potatoes after processing; and (4) chronic feeding studies.

In response to the Data Call-In Notice, Quimica Organica submitted certain PCNB data which were reviewed by the Agency. On March 31, 1986, the Agency notified the registrant that certain data were found to be inadequate and the following additional data had to be submitted by June 1986: manufacturing process, formation of impurities, analysis of samples, certification of limits, and analytical methods. These data were submitted and reviewed by the Agency.

On September 15, 1986, the Agency notified the Quimica Organica that certain product chemistry data were found to be inadequate and additional data must be submitted: manufacturing process, formation of impurities, preliminary analysis of product samples, certification of ingredient limits, and analytical methods to verify certified limits.

Uniroyal Chemical Co., Inc., and other companies cooperating in the submission of the potato processing study have been informed by the Agency that the study is inadequate and must be redone. They have the options of submitting adequate data, removing the potato use from the label, cancelling their product, or requesting a hearing. If the registrants do not accept any of these options, their products will be suspended.

III. AGENCY ASSESSMENT

A. Summary

The Agency has reviewed all data submitted to support the reregistration of pentachloronitrobenzene (PCNB). Based on the review of these data, the Agency has reached the following conclusions. Section B of this part includes a detailed discussion of the reviews of specific data.

1. Hexachlorobenzene (HCB) is a contaminant of technical grade PCNB. Prior to 1982, PCNB contained an impurity level of 1.5% to as high as 11% HCB. By April 1983, PCNB contained an impurity level of 0.5% HCB. Registrants of PCNB have agreed as a condition of continued registration to reduce the level of HCB to 0.1% or less by April 1988.

2. HCB has been classified by the Agency as a Group B2 carcinogen (a probable human carcinogen) on the basis of increased incidences of hepatic tumors in rats, mice, and hamsters.

3. PCNB has been classified by the Agency as a Group D carcinogen (an agent with inadequate animal and human evidence of carcinogenicity). After evaluating previously conducted chronic testing of PCNB in mice, the Agency concluded that the observed oncogenic effects associated with commercially produced PCNB were likely to have been caused by the presence of the contaminant, HCB.

4. Historically, levels of HCB in technical PCNB ranged from 1.5% to 11%. Currently, levels must be no higher tha 0.5%. The Agency has calculated exposure and risk estimates for applicators of PCNB and the general public exposed to PCNB in the diet assuming 0.5% and 0.1% levels of HCB. It was assumed that gloves were worn during the mixing-loading operation as required by the label.

    a. The average exposures are the following:

        1) Average dermal exposure of applicators to PCNB (with a 0.5% HCB contaminant level) is estimated to range from 7.4×10^{-5} to 1.7×10^{-6} mg/kg/day; and with a 0.1% HCB contaminant level, is estimated to range from 1.5×10^{-5} to 3.5×10^{-7} mg/kg/day.

        2) Dietary exposure to HCB from primary and secondary residues is estimated at 4.6×10^{-5} mg/kg/day.

b. The associated risks are the following:

1) The upper bound dermal oncogenic risks to users during mixing and loading and/or handling of PCNB with an HCB contaminant level of 0.5% is estimated to range from 10^{-4} to 10^{-6}; and with a 0.1% HCB contaminant level is estimated to range from 10^{-5} to 10^{-7}.

2) The 95% upper bound for increased oncogenic risks in the human diet from residues of PCNB with an HCB contaminant level of 0.5% is estimated to be 10^{-5}; and with an HCB contaminant level of 0.1% is estimated to be 10^{-6}.

5. Since PCNB does not meet the Special Review criteria for oncogenicity, the Agency will not place PCNB into Special Review at this time. The risk estimates for PCNB, with 0.1% HCB contaminant level, for applicators ranged from 10^{-5} to 10^{-6} and were based on 100% dermal absorption (in the absence of data). Once the chronic toxicity data required in this Standard are submitted and reviewed, the Agency will determine if further regulatory action is needed.

6. Review of the available FDA surveillance data on residues indicates that HCB is not frequently found in the presence of PCNB and vice versa, suggesting that recent usage of PCNB may not be a major source of dietary HCB.

7. Available data indicate that HCB may be associated with developmental toxicity effects observed at high doses in studies using PCNB contaminated with HCB.

8. Available data indicate that the No Observable Effect Level (NOEL) for PCNB is greater than 500 ppm for reproductive effects in rats.

9. While the data base is generally inadequate for understanding the environmental fate of PCNB, the available information on leaching do not indicate that PCNB is likely to contaminate groundwater.

10. The absence of appropriate environmental fate and non-target data precludes an assessment of hazard to endangered species. Label precautions required in this Standard should be adequate to protect fish and aquatic invertebrates while these data are being generated.

11. Registrants must use PCNB with no higher than 0.1% HCB for the toxicology and avian effects testing required in this Standard.

B. Preliminary Risk Analysis

To assess the risks associated with exposure to PCNB, the Agency reviewed existing oncogenicity studies. Based on the results of these studies and available exposure information, dietary and applicator exposure and risk estimates have been calculated. This section presents a discussion of the toxicology studies for PCNB and HCB, dietary exposure and risk estimates, and applicator exposure and risk estimates.

There are numerous studies on the effects of PCNB contaminated with HCB at varying concentrations showing both positive and negative results. Although the presence of the contaminant complicates interpretation of these results, it appears that the HCB contaminant could be responsible for the oncogenic results. However, additional data are needed to adequately assess the oncogenicity of PCNB.

1. PCNB Oncogenicity Studies

a. Rats

There are two studies relating to the oncogenicity of PCNB in rats. Male and female rats were fed diets containing 0, 100, 400, or 1200 ppm PCNB (2.7% HCB) for two years with no increased incidence of tumors (114223)[2]. However, mortality was greater than 50% in all groups by the end of the study, only 20 of the 50 animals of each sex in each group were examined microscopically, and many tumor diagnoses were made grossly. No individual animal data or historical control data were included in the report. In addition to these limitations, the reported results suggested that a NOEL was not established in this study. The study, classified as supplementary, cannot be used by itself to support the NOEL or Lowest Effect Level (LEL) for chronic toxicity in rodents, and does not fulfill applicable Agency data requirements.

In another study, male and female rats were given diets containing PCNB (HCB content was specified as <3%) for two years (114226). Dosages were expressed as time-weighted averages because of frequent changes in the dietary concentration of PCNB during the course of the 78-week treatment period. For males those doses were approximately 5000 and 10,000 ppm, and for females they were 7875 and 14,635 ppm. The treatment groups were maintained on control diets for the last 33 to 35 weeks of the study. There was an increase in pituitary chromophobe adenomas in male rats. The study report described the tumor as age-related, but no historical data for untreated rats of the same age and strain were presented. Removal of rats from treatment for the 33 to 35 weeks of the study, substantial dose changes throughout the study, and the absence of individual animal results restrict the use of this study in the assessment of PCNB's oncogenic potential in rats. This study was also classified as supplementary and is inadequate to fulfill applicable Agency data requirements.

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[2] The number in parentheses is a unique identification number assigned to each study. This number aids in identifying the bibliographic citation for a specific study.

The Agency has concluded that available data are inadequate to evaluate the oncogenic potential of PCNB in rats. An additional oncogenicity study in rats is required.

b. Mice

There are five studies relating to the oncogenicity of PCNB in mice. In a 1969 oncogenicity study (05010016), two strains of mice [(C57BL-6 x C3H/Anf) F1 and (C57B1/6 X AKR) F1] were given 464 mg/kg PCNB by stomach tube at seven to 28 days of age and there after in the diet at 1206 ppm up to necropsy at 78 weeks. A significantly elevated incidence of liver tumors was found in the treated C57B1/6 x AKR F_1 males. Ten of 17 (59%) treated males compared to 1 of 17 (6%) control males had hepatomas ($p<0.002$). The purity of the PCNB sample was not reported.

In a 1978 mouse study (114226), the time weighted average dietary levels for male B6C3F1 strain mice in the low and high dose groups were approxi-- mately 2600 and 5200 ppm PCNB (<3% HCB), respectively. For female B6C3F1 strain mice the dietary levels were 4100 and 8200 ppm in the low and high dose groups, respectively. Six months after the beginning of the study, 27% of the low dose group males and 70% of the high dose group males exhibited a hunched appearance which persisted in the survivors until the end of the study. Body weight decreased in treated female mice after week 35 of the study.

The incidence of hepatocellular carcinomas in female mice was 0/20, 0/14, and 3/20 in the control, low dose group, and high dose group, respectively. These results exhibited a statistically significant linear trend (p=0.04; Cochran-Armitage Trend Test), but the Fisher's Exact Test showed no statistically significant difference between the high dose and control groups. The authors noted that historical control data showed that female mice of the same age exhibited a 1% incidence of hepatocellular carcinoma (3/380) in the laboratory where the test was conducted. They also pointed out that there were a small number of animals examined in this study. No other increases in tumor incidence were observed in treated groups of mice. Although there was an increase in hepatocellular carcinomas (statistically significant trend), mortality in treated mice was considered excessive, and the study was repeated.

In the repeat study (GS128-003) conducted by the National Toxicology Program (NTP) in 1986, PCNB (<0.07% HCB) was given to male and female B6C3F$_1$ strain mice at dietary concentrations of 0, 2500, or 5000 ppm for two years. No increase in the incidence of neoplastic lesions was observed in treated mice, but the female mice of the high dose group contracted bacterial infection which decreased survival after the 86th week. No increased tumor incidences were observed in treated mice under the conditions of the experiment.

The results of a fourth study (114224) were used to calculate the potency factor (Q_1^*) used in the risk assessment presented in the Special Review document for PCNB (Position Document 1). Diets containing 0, 100, 400, or 1200 ppm PCNB (2.7% HCB) were fed to male and female Swiss mice for 80 weeks. The incidences of subcutaneous fibrosarcomas in female mice were 0/98, 2/100, 2/100, and 11/99 for the control, low, mid, and high dose group females, respectively. The tumors primarily occurred in the high dose group females, and a few were diagnosed earlier in that group than in any of the other treated groups. The only other skin lesions reported were abscesses. Fibromas were not mentioned in the report.

There were no individual data reported in this study, and results in some cases were presented as group means with no indication of the variation observed in each group. Time-to-diagnosis data were limited to general time periods instead of individual times (days of the study) of diagnosis. These limitations do not permit a complete evaluation of observed tumor incidences. However, the data as presented suggest that subcutaneous fibrosarcomas are likely to be the result of treatment.

Finally, the Agency's Special Review considered a tumor initiation study in mice (Searle, 1966) (42 FR 56072, October 20, 1977). PCNB dissolved in acetone was applied to shaved skin twice weekly for 12 weeks. The percentage of HCB in the PCNB administered to the mice is unknown. These mice then received applications of croton oil on the same skin area for 20 weeks. During the 20 weeks of croton oil treatment and for 20 weeks thereafter, the total number of tumors and the number of mice bearing visible tumors were noted. Papillomas less than 1 mm in diameter or persisting for less than three weeks were not counted. Mice from treated and untreated groups began to develop papillomas after 5-8 weeks of croton oil treatment. Papillomas increased in number until 5-10 weeks after the last croton oil applications, and some papillomas regressed. Seven treated males had tumors as compared to only one in the control group. Also, 14 of 20 treated males and females (combined), compared to 5 of 20 untreated males and females (combined) had papillomas.

2. HCB Oncogenicity Studies

HCB has been shown to increase the incidence of liver tumors in rats, mice, and hamsters. Data regarding the carcinogenicity of hexachlorobenzene in humans could not be located in the available literature. Animal data on HCB were evaluated by the Office of Research and Development and Office of Emergency and Remedial Response, U.S. Environmental Protection Agency. The results of this data evaluation were published in the document entitled "Health Effects

Assessment for Hexachlorobenzene", September 1984 (U.S.EPA)[3]. The information presented on the oncogenicity studies on HCB in this Registration Standard document is taken from that previously published report.

a. Rats

Smith and Cabral (1980)[3] exposed female MRC Wistar and Agus rats to 100 ppm hexachlorobenzene in their diets for 75 and 95 weeks, respectively. There was an increased incidence of liver tumors in both sexes of rats, but an evaluation of the statistical significance was not presented in the literature. Among hexachlorobenzene-exposed MRC Wistar rats, 4/6 developed liver cell tumors, compared to 0/4 of the control group; 14/14 treated Agus rats developed liver cell tumors, compared to 0/12 in the control group.

More recently, Lambrecht *et al*. (1983a,b)[3] fed groups of 94 male and 94 female Sprague-Dawley rats diets containing 0, 75, or 150 ppm hexachlorobenzene. Interim sacrifices for histopathological examination were performed on 4 rats of each sex/group at 10 intervals up to 64 weeks of treatment. The remaining 58 rats/group were allowed to continue to natural death or until 2 years of treatment. The number at risk was considered to be those surviving at least 12 months, as this was the earliest time to tumor observed.

Based on an average (weighted) food consumption of 22.6 and 16.5 g/rat/day for males and females, respectively, with average adult body weight of 400 and 265 g, the low dose was determined to be 4-5 mg/kg/day and the high dose, 8-9.5 mg/kg/day. The incidences of tumors observed in this study are presented in Table 1. The most striking observations were the high incidences and dose-related incidences of hepatocellular carcinomas in female rats and renal cell adenomas in male rats.

In an earlier study, Lambrecht *et al* (1982)[3] exposed rats to dietary concentrations of 0, 200, or 400 ppm hexachlorobenzene for 90 days. The authors associated treatment with an increased incidence of liver neoplasma, generalized lymphatic leukemias and a variety of renal lesions.

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[3] U.S. Environmental Protection Agency, Office of Research & Development, Office of Emergency & Remedial Response (1984) Health Effects Assessment for Hexachlorobenzene, (EPA/540/1-86-017, Contract No. 68-03-3112, Published study)

Table 1

Liver and Kidney Tumors in Sprague-Dawley Rats Given Hexachlorobenzene in the Diet for up to 2 years*

Exposure Level	Hepatoma		Hepatocellular Carcinoma		Renal Cell Adenoma		Renal Cell Carcinoma	
	M	F	M	F	M	F	M	F
0	0/54	0/52	0/54	0/52	7/54	1/52	0/54	1/52
Percentage	0	0	0	0	13	2	0	2
75 ppm	10/52	26/56	3/52	36/56	41/52	7/56	0/52	2/46
Percentage	19	46	6	64	79	13	0	4
150 ppm	11/56	35/55	4/56	48/55	42/56	15/54	0/56	2/54
Percentage	20	64	7	87	75	28	0	4

*Source: Lambrecht et al., 1983a,b

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b. Mice

Cabral et al (1979)[3] exposed Swiss mice of both sexes to dietary concentrations of 300, 200, 100, 50, or 0 ppm hexachlorobenzene for 15, 101, 106, 120, or 120 weeks, respectively. An increased incidence of liver cell tumors was observed at dietary concentrations $\geq$ 100 ppm hexachlorobenzene. Liver cell tumor incidences were 1/16 for males, 1/26 for females; 7/44 for males, 14/41 females; 3/29 for males, 3/30 for females in groups exposed to 300, 200, or 100 ppm hexachlorobenzene, respectively. Liver cell tumors were not observed in mice exposed to 0 or 50 ppm hexachlorobenzene. No other tumors were reported as having increased incidences in either sex.

Cabral et al. (1977)[3] fed diets containing 0, 50, 100, or 200 ppm hexachlorobenzene to Syrian golden hamsters for life. These diets resulted in increased rates of alveolar (sic) adenomas of the thyroid, hepatomas of the liver and hemangioendotheliomas of both the liver and spleen in male and female hamsters. The incidence of total tumor-bearing animals appeared to be dose-related: 10% of the control group, 56% of the low-dose group, and 75% of the middle-dose group and 92% of the high-dose group developed tumors. Tumor incidence data were highly significant.

c. Other Relevant Data[3]

According to the U. S. EPA (1984), mutagenicity has been observed in Saccharomyces cerevisiae at a minimum concentration of 100 ppm. Lawlor et al. (1979) tested the mutagenic activity of hexachlorobenzene in Salmonella typhimurium strains TA98, TA100, TA1535, TA1537, and TA1538, with and without activation by Aroclor 1254, induced rat hepatic microsomes. Hexachlorobenzene was associated with no detectable mutagenicity in any of the strains tested, with or without metabolic activatin. Dosage levels were unspecified.

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[3] Ibid.

In a dominant lethal assay male rats were treated with 0, 70 or 221 mg hexachlorobenzene/kg by gavage for 5 consecutive days. A dose related depression of male reproductive function occurred, but dominant lethal mutations were not observed (Simon et al., 1979). Khera (1974) also reported a lack of dominant lethal mutations in Wistar rats following gavage administration of 0, 20, 40 or 60 mg hexachlorobenzene/kg for 10 consecutive days.

3. Weight of Evidence: PCNB and HCB Oncogenic Potential

a. PCNB

Although there are a number of oncogenicity studies using PCNB as the test substance in which oncogenic effects were observed, the Agency believes based on several mouse studies involving PCNB with different levels of HCB that it is likely that HCB, a contaminant in PCNB, is responsible for the observed oncogenic effects. Some studies with PCNB are reportedly negative, but all of these studies, except for the new NTP study (GS128-003), are limited in some way and thus the Agency cannot rely on them to characterize the oncogenic potential of PCNB. The Agency has reviewed a negative mouse study conducted with relatively pure PCNB (0.07% HCB) that is considered valid and a number of valid mutagenicity studies. A rat study and additional mutagenicity data must be submitted to completely assess the oncogenic potential of PCNB. For these reasons, the Agency has classified PCNB in Group D, not classifiable as to human carcinogenicity, according to the Guidelines for Carcinogen Risk Assessment (51 FR 33992).

These guidelines describe the general framework to be used in developing an analysis of carcinogenic risk with regard to assessing the weight of evidence of carcinogenicity from human and animal studies. Based on the weight-of-evidence analysis of available data, chemicals are categorized with regard to their potential human carcinogenicity. Under EPA's classification system, Group A, "Human Carcinogen," is reserved for those chemicals fro which there is sufficient evidence of carcinogenicity from human epidemiological studies. Group B, "Probable Human Carcinogen," is divided into subgroups 1 and 2. Group B_1 requires some human epidemiological evidence.

Under the carcinogen risk assessment guidelines, chemicals are categorized as Group B_2 carcinogens if there is "sufficient evidence" of the chemical's carcinogenicity from animal studies. By comparison, Group C ("Possible Human Carcinogens") chemicals are so classified if these is "limited evidence" from animal studies. There is also a Group D ("Not Classified") and a Group E that is reserved for chemicals shown to be non-carcinogenic in animal and/or human studies.

Two of the four mouse feeding studies using PCNB were positive for oncogenicity. One study (5010016) utilized PCNB thought to contain 11% HCB. The Agency has noted (U. S. EPA, 1984)[3] that dietary levels of 100 ppm HCB or greater increased the incidence of liver cell tumors in mice. A dose level of approximately 1200 ppm PCNB (including approximately 130 ppm HCB) was tested by Innes et al. (5010016), and the investigators diagnosed liver tumors. Therefore, the first positive study cannot be used to associate an oncogenic response in mice with PCNB.

Another positive study (114224) was conducted with PCNB containing 2.7% HCB (equivalent of approximately 130 ppm), and fibrosarcomas were the only tumors increased by PCNB treatment. This study was reported in summary form, and additional data (including historical control data on the incidence of skin tumors in the strain of mice tested, the incidence of fibromas in this study, and individual animal body weights and day of death during the study) have been requested to support a more complete evaluation of the results (Gardner, 1986).

Although two long-term rat feeding studies with PCNB (containing approximately 3% HCB) were negative (114223 and 114226) these data are of limited value. There was excessive mortality in all groups and microscopic examinations were incomplete in the first study, and the second study tested excessively toxic doses which were substantially changed throughout the experiment and withdrawn for the last 33 to 35 weeks of the two-year study. Microscopic examinations of test animals in the second study were also limited.

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3 Ibid.

In addition, the level of HCB contamination in both PCNB rat studies was greater than lowest-observed-effect levels (LOEL) described by the Agency (U. S. EPA, 1984)[3] for HCB alone. In one PCNB study (114223) the highest dietary level of HCB was 2.7% of 1200 ppm or 32 ppm, and in the other PCNB study (114226), the highest HCB level was approximately 300 ppm for males and 440 ppm for females. However, LOEL's in rats exposed to HCB ranged from 40 to 32 ppm with effects such as hepatic enzyme induction, increased cytochrome P-450, body weight loss, and mortality in female rats. Increased incidences of hepatocellular carcinomas in female rats and renal cell adenomas in male rats were seen after chronic feeding of diets containing 75 ppm HCB or more (U. S. EPA, 1984).

In the National Cancer Institute's (NCI) mouse study of PCNB containing <3.0% HCB (114226), which was negative for oncogenicity, excessive mortality was observed. Substantial dose changes were made during the experiment. The study was repeated by the National Toxicology Program (NTP) in the same strain of mice (B6C3F1) (NTP, 1986) with PCNB containing <0.07% HCB. The test substance predisposed the female mice of the high dose group (5000 ppm) to a bacterial infection which decreased survival significantly after the 86th week of the study. No increased tumor incidences were observed in treated mice under the conditions of the experiment. This study is an acceptable study for assessing the oncogenic potential of PCNB in mice.

A tumor initiation study described in the Agency's Notice of the Special Review for PCNB (Searle, 1966) (42 FR 56072) suggested that the test substance induced skin tumors (papillomas) in male and female mice. The study did not specify the purity of the PCNB tested, and it was conducted at a time when available PCNB was probably contaminated with considerable amounts of HCB (2.7 to 11%).

The Agency concluded in its Special Review of PCNB that the majority of evidence on mutagenicity was negative. In subsequent studies (NTP, 1986) a chromosomal aberration assay in CHO cells suggested that the test substance has an effect on chromosome structure. Because there were no genotoxic effects other than chromosomal aberrations and because those effects were not clearly dose related, the NTP report concluded that further cytogenetic studies, both in vivo and in vitro, would be required to characterize the genetic toxicity of PCNB.

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[3] Ibid.

The following factors support the conclusion that there are not sufficient data to assess the oncogenic potential of PCNB. Additional oncogenic data are required in the rat along with further mutagenicity tests to complete the oncogenicity assessment.

1. The PCNB used in many of the relevant studies was contaminated with HCB which the Agency has classified as a probable human carcinogen (Group B_2) on the basis of increased incidence of hepatic tumors in rats, mice, and hamsters. The contaminant has a potency factor (Q_1*) of 1.7 $(mg/kg/day)^{-1}$.

2. Excessive toxicity or generally low survival of test animals in the long-term rat feeding studies makes them inadequate for use in an assessment of PCNB's carcinogenic potential. (The Agency does not expect to receive a new chronic rat toxicity study until July 1991.)

3. A 2-year mouse feeding study with PCNB containing <0.1% HCB was negative for oncogenicity.

4. Additional information (historical control data on the incidence of skin tumors in the strain of mouse tested and individual animal body weights and day of death during the study) has been requested on the mouse oncogenicity study demonstrating an increased incidence of fibrosarcomas in females given PCNB (2.7% HCB) to completely evaluate the results of the study.

5. Most of the available mutagenicity studies on PCNB suggest that it is not mutagenic. One study reported by the NTP (1986) suggests that the test substance has an effect on chromosome structure, but additional studies are being done by the NTP to confirm those results.

Thus, according to the criteria for evaluating the overall weight of evidence of carcinogenicity to humans developed by the Carcinogen Assessment Group of the U.S. EPA (51 FR 33992), PCNB is most appropriately classified in Group D, not classifiable as to human carcinogenicity. This classification group is used for chemicals with inadequate human and animal evidence of carcinogenicity or for which no data are available.

b. HCB

Reports of carcinogenicity of hexachlorobenzene in humans could not be located in the available literature. Smith and Cabral (1980) demonstrated a compound-related increased incidence of liver cell tumors in female MRC Wistar and Agus rats exposed to dietary levels of 100 ppm hexachlorobenzene for 75 or 95 weeks. Liver neoplasms were observed in rats exposed to 200 or 400 ppm hexachlorobenzene for 90 days (Lambrecht _et al_., 1982) and liver and kidney tumors were noted in rats exposed to 75 or 150 ppm in the diet for up to 2 years (Lambrecht _et al_., 1983a,b). At dietary levels of $\geq$100 ppm for 106 weeks, Swiss mice showed an increased incidence of liver cell tumors (Cabral _et al_., 1979). Finally, Cabral _et al_. (1977) demonstrated significant increases in the incidences of alveolar adenomas of the thyroid, hepatomas of the liver and hemangioendotheliomas of both the liver and spleen in Syrian golden hamsters exposed to hexachlorobenzene. These animal studies provide sufficient evidence that hexachlorobenzene is an animal carcinogen.

Thus, according to the criteria for evaluating the overall weight of evidence of carcinogenicity to humans developed by the Carcinogen Assessment Group of the U. S. EPA (51 FR 33992) hexachlorobenzene is most appropriately classified in Group B2, probable human carcinogen.

4. PCNB - HCB Dietary Exposure and Risk Assessment

The Agency determined in 1982 that use of PCNB could continue if registrations were amended to reflect the lower HCB contamination levels, but a dietary risk assessment was not performed at that time. A dietary exposure and risk assessment was done for inclusion in this Registration Standard but the reliability of the estimates is limited by the quality of data available.

At the time the Special Review on PCNB was terminated, the PCNB registrants agreed to reduce the level of HCB in technical PCNB. By reducing the HCB level from 1.5% to 0.5%, the dietary burden is reduced three fold. By subsequently reducing the HCB contamination to 0.1%, the dietary burden and risk is correspondingly reduced further by a factor of 5.

The dietary exposure analysis summarized in Table B-2 is based on the following assumptions:

- The level of HCB contamination is 0.5%, the current maximum under the conditions for registration established at the termination of the Special Review.

- Primary residue values used for raw agricultural commodities (RAC's) are the highest values expected from available field trials.

- In instances where current labels permit application values higher that those used in the field trials, it is assumed that the higher application rate is generally used.

- The recent history of use on crops is a predictor of future usage (Torla, 1986).

- In the case of bananas, the Agency has no residue data, no estimate of percent of crop treated and no bioconcentration data for HCB. From 1979 to 1985, however, the Food & Drug Administration (FDA) did not detect either PCNB or HCB residues in imported bananas (RCB Addendum, August 1, 1986). For small grains, no residue data from field trials were available, but the FDA detected residues in 12 samples of wheat from 1979 to 1985. (It should be noted that no FDA data are presently available regarding the total number of samples analyzed using methods capable of determining residues of PCNB. Therefore, the actual significance of the monitoring data cannot be determined.) Thus, we assume that residue contributions from these RAC's will not have a substantial effect on the total exposure.

- It is assumed that cattle and poultry are fed maximum dietary levels of RAC's contaminated with highest expected residues of HCB, corrected for percent of crop treated.

The analysis in Table 2 suggests that 97% of the dietary exposure is derived from secondary residues in meat, milk, poultry and eggs, making the underlying assumptions for this source critical. A comparison of the amount of cottonseed required to feed cattle at the maximum theoretical rate with that which is actually available for use as a feed indicates that only about 4.0% of the required seeds is available. A consideration of other RAC's and livestock would yield similar results. Therefore, in Table 2, the estimate of 4.4×10^{-5}mg/kg/day for secondary residues is multiplied by 4% to give 2×10^{-6} mg/kg/day (Barbehenn, Dec. 12, 1986).

Combined with primary residues and multiplied by the oncogenic potency for HCB [Q_1^* is 1.7 $(\text{mg/kg/day})^{-1}$], the 95% upper bound for increased oncogenic risk is 6×10^{-6} for PCNB contaminated with 0.5% HCB. At 0.1% HCB contamination, exposure would be reduced 5-fold and the risk would be 1×10^{-6}. Prior to the 1982 decision, the risk would have been 2×10^{-5} with an HCB contamination of 1.5%.

Table 2. Dietary Exposure from 0.5% HCB in PCNB

Crops	Max. expected1/ residue (ppm)	% of crop treated	Food2/ Factor (%)	Exposure x 10^6 (mg/kg/day)
Primary Residues				
Cottonseed	0.009	11	0.15	0.04
Peanuts	0.14	<5	0.36	0.6
Beans	0.02	4	0.98	0.2
Broccoli	0.0023/	<1	0.10	0.0005
Brussel sprouts	0.0023/	13	0.03	0.0002
Cabbage	0.002	11	0.74	0.04
Cauliflower	0.0023/	8	0.07	0.003
Garlic	NA	14	0.03	NA
Peppers	0.001	12	0.12	0.004
Potatoes	0.07	<1.	5.43	0.95
Tomatoes	0.001	1	2.87	0.007
SUBTOTAL				1.8 x 10^{-6} mg/kg/day
Secondary Residue4/				
Cattle	0.02		7.18	36
Milk	0.0008		28.62	5.7
Poultry	0.003		2.94	2
Eggs	0.0004		2.77	0.3
SUBTOTAL				4.4 x 10^{-5} mg/kg/day
TOTAL				4.6 x 10^{-5} mg/kg/day

NA - Not Available

1/ - Derived from Hummel (August 8,1986) and corrected for maximum allowable application rates as described in the text.

2/ - The food factor is the percentage of a 1.5kg daily diet represented by a given crop.

3/ - Assumed to be the same as cabbage.

4/ - Derived from Hummel (Dec.4,1986); assumes percent of crop treated for feed RAC's.

5. PCNB & HCB Applicator Exposure and Risk Assessment

a. The Agency has evaluated numerous publicly available scientific articles on exposure monitoring for pesticide work activities similar to those employed in the application of PCNB (referred to as surrogate data). These studies were used to estimate exposure to HCB according to established exposure assessment procedures. The results of an applicator exposure study submitted by the registrant was reviewed and found to be inadequate because there were not enough replicate samples. However, the results from this study, where comparable, are consistent with the results obtained from the surrogate data base used for this assessment.

b. Calculation Assumptions: The following assumptions apply to the three major use patterns: planter box, turf and transplant.

   1) Respiratory exposure is insignificant compared to dermal exposure for the three uses.[4/]

   2) Gloves are worn by workers using PCNB during mixing-loading operations only (required on label); and gloves with long pants and a long sleeve shirt reduce total dermal exposure 80%.[5/]

   3) Dermal absorption is assumed to be 100%.

   4) Exposure is assumed to be amortized over 365 days for 40 working years of a 70 year lifetime ([LADD] lifetime average daily dose).

   5) HCB contamination levels are assumed to be 0.5% and 0.1% (wt HCB per wt PCNB)as required for continued registration.

[4/] Protection of this type is assumed to reduce exposure to covered body areas about 80% because some pesticide will penetrate the material or filter in around edges or hems of clothing. Waldron, A.C. "Minimizing Pesticide Exposure Risk for the Mixer-Loader, Applicator, and Field Worker", Dermal Exposure related to Pesticide Use, ACJ Symposium Series 273, 1985, pp.413-415.

[5/] Maddy *et al*., "Risk Assessment of Excess Pesticide Exposure to Workers in California." ACS Symposium Series 273, 1985, pp.445-461.

c. Surrogate Data Bases

1) Mixing and Loading Solid Formulations.

In the only study with sufficient information for calculating mixing and loading exposures there were eight replicates of exposure during mixing and loading of a wettable powder formulations averaged 1.1 mg/lb a.i. Assuming 80% protection, exposure is 0.22 mg/lb a.i. with gloves.

2) Ground Boom Spraying

Six studies containing a total of 92 replicates were evaluated and used as a surrogate database for this assessment.

The geometric mean for exposure derived from the studies described above was 6.3 mg/hr normalized to 1 lb a.i./A. (It is assumed that exposure is proportional to application rate. Therefore, for 2 lb a.i./A, exposure is 12.6 mg/hr, etc.)

d. Calculations

The exposure estimates presented below were calculated for the three major use patterns and representative formulations.

Sample Calculation (0.5% HCB contamination)

(Total amount of active ingredient (a.i.)) x

(number of boxes filled/yr) x (% a.i./lb. of formulation) x

(estimated exposure/lb. a.i.) x (%HCB in PCNB) x (70 kg/man) x

$$(365 \text{ days/year}) \times \left(\frac{40 \text{ years work life}}{70 \text{ year lifetime}}\right) = \text{mg/kg/day HCB}$$

1) Planter Box. 4.5 lbs of a 20% dust is used in each box. Eight boxes each are filled 10 times over the year. It is assumed that exposure during the filling operation is comparable to mixing and loading a wettable powder (WP).

4.5 lb form./box x 80 boxes/yr x 0.2 (a.i./form) x 0.22

mg exposure/lb a.i. x 5×10^{-3} HCB/PCNB x 1/70 kg^{-1}bw x

$$1/365 \text{ yr/days} \times \frac{40 \text{ yrs work}}{70 \text{ yr lifespan}} = 1.7 \times 10^{-6} \text{ mg/kg/day HCB.}$$

2) Turf. A 75% WP is applied at the rate of 0.75 lb a.i./1000 ft^2 =32.67 lb a.i./A. Three acres are treated four times per year for a total of 2.8 hrs. The same individual does both the mixing and applying.

Sample Calculation (0.5% HCB contamination)

Applicator

6.3 mg exposure/hr x 2.8 hr/yr x 32.67 lb (a.i./A correction factor)

$5 \times 10^{-3}\ \frac{\text{HCB}}{\text{PCNB}} \times 1/70\ \text{kg}^{-1}\text{bw} \times 1/365\ \text{yr/days} \times$

$\frac{40\ \text{yrs working}}{70\ \text{yr lifetime}} = 6.4 \times 10^{-5}$ mg/kg/day HCB.

Mixer/loader

32.67 lb a.i./A x 12 A/yr = 392 lb a.i./yr

0.22 mg exp./lb a.i. x 392 lb a.i./yr x 1/70 kg bw x

$5 \times 10^{-3}\ \frac{\text{HCB}}{\text{PCNB}}\ 1/365\ \text{days/yr} \times \frac{40\ \text{yrs work}}{70\ \text{yr lifetime}} =$

9.6×10^{-6} mg/kg/day

Total Exposure = applicator plus mixer/loader exposure

$6.4 \times 10^{-5} + 9.6 \times 10^{-6} = 7.4 \times 10^{-5}$ mg/kg/day.

3) Transplant. Assume that the bulk of total exposure occurs during mixing/loading. 15A is treated with a water suspension at a rate of 7.5 lb a.i./A once a year (total = 112.5 lb a.i./yr.)

Sample Calculation (0.5% HCB contamination)

0.22 mg exp./lb a.i. x 112.5 lb a.i./yr x 1/70 kg^{-1}bw

$\times\ 5 \times 10^{-3}\ \frac{\text{HCB}}{\text{PCNB}} \times 1/365\ \text{year/days} \times \frac{40\ \text{yrs work}}{70\ \text{yr lifetime}} =$

2.7×10^{-6} mg/kg/day

e. Summary Table of Applicator Exposure & Risk

Lifetime Average Daily Dose (LADD) Exposure to HCB* (mg/kg/day)

	0.5% contaminant	0.1% contaminant
Planter box	1.7×10^{-6}	3.5×10^{-7}
Turf	7.4×10^{-5}	1.5×10^{-5}
Transplant	2.7×10^{-6}	5.5×10^{-7}

Quantitative Risk Assessment/HCB**

	0.5% contaminant	0.1% contaminant
Planter box	10^{-6}	10^{-6}
Turf	10^{-4}	10^{-5}
Transplant	10^{-5}	10^{-6}

* unadjusted for dermal absorption

** 95% upper bound on the increased probability of cancer from exposure to a probable human carcinogen [B2] with a potency of $Q_1^* = 1.7$ (mg/kg/day)$^{-1}$ (U.S.EPA, 1984).

C. Other Science Findings

1. Chronic Feeding Studies

In order to completely assess the data base for PCNB, chronic feeding studies were evaluated to determine the NOEL for PCNB's toxicity in establishing an acceptable daily intake (ADI) level for dietary purposes.

a. Dogs

In a two-year dog study (114232), males and females were fed diets containing 0, 500, 1,000, or 5,000 ppm PCNB (purity not specified). Liver changes occurred in all groups and the degree of change was dose related. The 5,000 ppm level produced fibrosis, narrowing of hepatic cells, thick leukocytic infiltration, and increased size of the periportal areas. At the 500 and 1,000 ppm levels, the changes were similar but to a lesser degree. The highest level also produced atrophy of bone marrow and reduced hematopoiesis.

In a second two-year feeding study dogs were administered 0, 30, 180, and 1080 ppm (114201). The study results indicated that administration of PCNB to dogs indicated that PCNB (1.4% HCB) caused liver weight increases, increased liver-to-body weight ratios, elevated serum alkaline phosphatase levels, and microscopically observed cholestatic hepatosis with secondary bile nephrosis at 1080 ppm (the highest dose tested). The cholestatic changes were observed in all animals given diets containing 180 and 1080 ppm PCNB, and one of three male dogs in the 30 ppm dose group exhibited the microscopic changes (no female dogs were affected). These histopathologic changes were moderate in the 1080 ppm group and minimal in the 180 ppm group. Based on these results, 30 ppm was the NOEL and 180 ppm was the LOEL in dogs (114201). This study satisfies the requirement for chronic testing in a non-rodent species.

b. Rats

In a two year rat feeding study (114223), males and females were fed diets containing 0, 100, 400, or 1200 ppm PCNB (2.7% HCB). Mortality was greater than 50% in all groups and only 5 to 10 animals were used to obtain group mean body weights at the end of the study. Only 20 of the 50 animals of each sex in each group were examined microscopically, and many tumor diagnoses were made grossly. No individual animal data or historical control data were included in the report. In addition to these limitations, reported results suggested that a NOEL was not established in this study. Therefore, this study can not be used by itself to support the NOEL or LEL for chronic toxicity in rodents which were suggested by the results.

2. Developmental Toxicity

a. Rats

Courtney et al (114250) tested two grades of PCNB that contained approximately 11% and 1% HCB. Neither test substance affected maternal body weight gain, liver-to-body weight ratio, or fetal weights at the single dose level tested (500 mg/kg/day). The average litter size for dams given the PCNB containing 11% HCB was reduced (8.2 per litter compared with 10 in the controls) and malformations (enlarged cerebral ventricles, umbilical hernias, and slightly enlarged renal pelvises) occurred at a slightly higher incidence than in control animals. The small number of animals per dose preclude definite conclusions.

In the Agency's health effects assessment (U.S.EPA, 1984) of the contaminant HCB, Khera (1974)[3] found HCB to be toxic to pregnant rats and their fetuses at doses of 80 and 120 mg/kg/day. A NOEL was established at 60 mg/kg/day. This study and the marginal effects observed by Courtney et al (114250) suggest that HCB, an impurity of PCNB, may have a role in the developmental toxicity of PCNB at high doses. Deficiencies in the statistical analysis and the apparent inconsistencies with respect to the maternal and fetal weight data and incidence of runts makes this rat study (114204) unacceptable in an assessment of HCB's potential developmental toxicity.

A third study (114199) did not include observations such as maternal body weight and food consumption during gestation, and there were no effects noted at any dose (125 mg/kg highest dose tested). The results reported by Courtney et al. (114250) suggest that sufficiently high doses were not evaluated, and this study cannot be used to assess the potential for developmental toxicity of PCNB. Because of the limitations associated with the three studies above, an additional study in rats is needed.

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[3] Ibid.

b. Mice

The available mouse study (114250) used only one dose and a small number of animals per dose group. These test conditions, sufficient for a preliminary test, preclude the use of this study to fulfill the Agency's requirement for a teratology test in a second species.

3. Reproductive Effects

A reproduction study (0001666) was conducted in rats with PCNB which contained 1.4% HCB. Dietary concentrations of up to 500 ppm (1.4% HCB) had no effect on reproduction. Weights for parental animals were reported only at mating and at weaning of offspring, no food consumption data were included, and pups were not weighed at birth or during lactation. In addition, microscopic examinations of test animals did not reveal effects, but histopathological examinations were confined to 10 pups of each sex from each group in the third generation. Despite these limitations, the study suggests that the NOEL for reproductive effects in rats is greater than 500 ppm. No further reproduction data are required.

4. Mutagenicity

The preponderance of the studies reviewed were negative for mutagenic activity. Bacterial assays for reverse or forward mutations, differential toxicity and DNA repair were conducted in *Salmonella typhimurium* (114206, 5009139, and 26358), *Escherichia coli* (5009139, Mohn, 1971, Shirasu *et al.*, 1976, and Clark, 1971), and *Bacillus subtilis* (5009139). A mitotic recombination assay was conducted in *Saccharomyces cerevisiae* (5009139), and a recessive lethal assay was done in *Drosophila melanogaster* (5003752). *In vitro* unscheduled DNA synthesis in human fibroblast cells (5009139); and dominant lethal assays with mice (5009139 and 26358) were also conducted. The *E. coli* assay reported by Clark (1971) was the only positive assay.

More recent studies were conducted in conjunction with an oncogenicity study (NTP, 1986), and the reverse mutation assay in *Salmonella typhimurium*,, an *in vitro* assay in mouse lymphoma cells (point mutation assay), and a sister chromatid exchange assay in

Chinese hamster ovary (CHO) cells also did not show that PCNB had mutagenic activity. However, a chromosomal aberration assay in CHO cells suggest that the fungicide has an effect on chromosome structure. The effects were observed at doses of 7.5, 24.0, and 75.0 ug/ml both in the presence and absence of metabolic activation. However, the authors noted that there were no genotoxic effects other than chromosomal aberrations, and those effects were not clearly dose related. The NTP report concluded that further cytogenetic studies, both *in vivo* and *in vitro*, would be required to understand the genetic toxicity of pentachloronitrobenzene.

5. Metabolism

a. Rats

The major route of excretion for PCNB and its metabolites in rats is the feces (114207, 114208, 114209, and 114256). Eighty-five to 88% of the administered radioactivity was recovered from the excreta 6 days after treatment (10 to 12% in the urine). Female rats have a more rapid fecal excretion rate during the first 24 to 48 hours after dosing than the males.

The major metabolite in the feces was identified as pentachloroaniline and its conjugates (97800, 114208, and 114251). Similar metabolites in the feces of rats treated orally and intravenously suggested that biliary excretion occurs (114251), but PCNB is also metabolized to pentachloroaniline in the gastrointestinal tract as shown by *in vitro* studies (114251) and in the feces without absorption.

Analysis of tissues, feces, blood, bile, and urine samples from rats fed PCNB for 7 months to 2 years indicated that the impurities (hexachlorobenzene and pentachlorobenzene) and a metabolite (pentachlorophenol) rather than PCNB accumulated in the fat (60561).

Blood levels peaked 12 hours after oral administration of a single 5 mg/kg dose. The maximum level observed was 0.62 ppm, and the halflife for radiolabel in the blood was calculated to be 21.8 hours (114256). Residue concentrations in the liver, kidney, and carcass six days after dosage administration were reported to be 0.04, 0.16, and 0.01 ug/g of tissue respectively, and the ratio of the residue concentrations in plasma to those in red blood cells at 12, 60, and 144 hours after dosing were 3, 2, and 0.7, respectively.

The overall metabolic pathway in rats (114256) indicates that PCNB absorbed after an oral dose is largely excreted in the form of N-acetyl-S-pentachlorophenylcysteine (48%) or pentachloroaniline and its conjugates (18%). Pentachlorophenol accounted for approximately 4% of the administered radiolabel, and methyl pentachlorophenyl sulfide accounted for 0.2% of the administered radioactivity (114256).

b. Dogs

Analysis of tissues, feces, blood, bile, and urine from dogs fed PCNB for 2 years indicated that the impurities rather than PCNB accumulated in the fat (60561). Metabolites identified in the feces and urine were similar to those found in rats (60561).

c. Rhesus monkeys

Blood levels peaked first at 1.5 hours and later at 7 hours after administration of a single 0.5 mg/kg dose of radiolabelled PCNB (114233). Fecal and urine samples collected 24 hours after dosing accounted for 28.5 and 21.8% of the administered activity, respectively. The respective proportions of the dose recovered from urine and fecal samples over the 5 days following treatment were 39.9 and 41.5%, respectively.

The biological half-life for elimination of radiolabelled residues of PCNB (after a single 2.0 mg/kg dose) was estimated to be 1.5 to 1.7 days, and after 14 days most of the recovered radioactivity was found in the feces (47% of label recovered as compared with 38% of the administered dose). The highest concentration of radioactive residues were found in the bile (275.9 ppm 24 hours after dosing) indicating that biliary excretion occurs in monkeys.

At a higher single dose (91 mg/kg), the half-life for elimination was extended to 4 days (114233). Approximately 60% of the administered dose was accounted for in excreta within 20 days of the treated monkeys. The half-life of activity in plasma was estimated to be 6 days.

In an experiment using repeated daily doses equivalent to 2 ppm in the diet, an equilibrium between intake and excretion was reached after 30 to 40 doses (114233). Approximately 90% of the administered radioactivity had been excreted by the 71st day of the study (the day after treatment was terminated). Ten days after dosing was stopped (day 80 of the study) approximately 95% of the administered radioactivity had been accounted for in the excreta. The bile contained the highest concentrations of PCNB residues (7.73 and 3.72 ppm in males and females, respectively). Concentrations in the liver, kidney, fat, bone marrow, and thymus ranged from 0.1 to 0.2 ppm. Metabolites identified in the urine and feces of treated monkeys are reported in Table 1 along with the proportion of the radioactivity they represent.

Table 3. Metabolites and the percentage radioactivity presence in the urine and feces (118937)

	14 days after a single oral dose of 2 mg/kg		20 days after a single oral dose of 91 mg/kg	
Metabolite	Urine	Feces	Urine	Feces
Pentachloroaniline	53.2	66.0	36.0	66.2
Pentachlorobenzene	11.7	1.0	11.9	1.1
Pentachlorophenol	12.2	--	17.5	--
Pentachlorothioanisole	9.7	6.2	10.3	6.2
bis-methylmercaptotetrachlorobenzene	9.7	7.1	9.2	7.1
PCNB	--	16.3	--	12.9

6. Dermal Absorption

The amount of radiolabelled PCNB excreted by rats during a 5-day dermal exposure or during the 5 days after a 4-hour dermal exposure was small (approximately 30% of the dose during the 5-day exposure and 1 to 2% after the 4-hour exposure) (129446). Approximately 5 times as much radioactivity was excreted in the feces as was recovered from the urine, and there was no significant differences with respect to the formulation during the 5-day exposure. Animals treated with the 20% dust formulation showed an absorption rate which was approximately twice that for the 75% Wettable Powder after the 4-hour exposure.

Presently, the Agency does not know of a definitive test protocol to study dermal absorption of the PCNB contaminant, HCB. The Agency also has no basis for estimating the absorption rates of HCB.

7. Immunotoxicity

Hamsters were given a single dose of 6 gm/kg PCNB by gavage to evaluate the effect of PCNB on cellular and humoral immunity (Dandliker et al., 1980). The fungicide was found to stimulate cellular immunity and reduce the amount of antibody produced in response to an immunogen. The binding affinity of antibody to antigen was observed to increase two- to five-fold in PCNB treated hamsters when they were compared with untreated animals. However, the experiments described by the investigators were not designed to evaluate the toxicological significance of the immunological effects of PCNB.

8. Acute Toxicity

PCNB has been classified as Toxicity Category III for oral and dermal toxicity, and Category IV for inhalation toxicity, primary eye and dermal irritation. No data were available for dermal sensitization. Therefore, a skin sensitization study is required.

The low acute toxicity of PCNB (TOX Categories III & IV) does not warrant a reentry interval.

9. Environmental Fate Concerns

While the data base is generally inadequate for understanding the environmental fate of PCNB, the available information on leaching do not indicate that PCNB is likely to contaminate ground water. Preliminary data indicate that peanuts may bear detectable residues of PCNB when planted in rotation with a broadcast application made eight months earlier. An interim prohibition against rotating root crops for 12 months after broadcast and banding applications is appropriate. We have no basis at this time to prohibit the rotation of non-root crops following broadcast treatment or root crops following either seed or transplant treatment with PCNB. If significant residues are found in crops planted more than one year after application, a tolerance may be required for all such crops.

10. Ecological Effects

Limited data on PCNB indicate that it is toxic to certain fish species (LC_{50} = 0.88 ppm for bluegill, 0.50 ppm for rainbow trout, in formulated product tests) and to aquatic invertebrates (daphnid LC_{50} = 0.77 ppm). Toxicity to terrestrial organisms is low (mallard duck and bobwhite quail LC_{50} values > 5000 ppm; rat acute oral LD_{50} approximately 2 g/kg). However, the potential for chronic effects on avian species resulting from certain use patterns for PCNB cannot be assessed without additional data. Since this compound is toxic to aquatic organisms in laboratory studies, label precautions are required to alert the user to the potential for adverse effects on aquatic organisms.

Assessment of hazard to endangered species will be deferred pending review of the required data.

D. Tolerance Reassessment

A tolerance has been established at 0.1 ppm for residues of PCNB in or on cottonseed in 40 CFR §180.291. In addition, the following interim tolerances for PCNB are established in 40 CFR §180.319: 1 ppm in or on peanuts and 0.1 ppm in or on bananas, beans, broccoli, brussels sprouts, cabbage, cauliflower, garlic, peppers, potatoes, and tomatoes. (See Table 4).

A two-year feeding study with dogs govern diets containing 0, 30, 180, or 1080 ppm (114201) indicated that PCNB (1.4% HCB) caused liver weight increases, increased liver-to-body weight ratios, elevated serum alkaline phosphatase levels, and microscopically observed cholestatic hepatosis with secondary bile nephrosis at 1080 ppm (the highest dose tested). The cholestatic changes were observed in all animals given diets containing 180 and 1080 ppm PCNB, and one of three males in the 30 ppm dose group exhibited the micorscopic changes (no female dogs were affected). The authors noted that these histopathologic changes were moderate in the 1080 ppm group and minimal in the 180 ppm group. Based on these results, 30 ppm was the NOEL and 180 p3m was the LOEL in dogs.

The dog was determined to be the most sensitive species for PCNB. The NOEL for this study is 30 ppm which is the lowest NOEL used for calculating a Provisional Acceptable Daily Intake (PADI).

Because of the absence of a chronic feeding study in rats and teratology studies in two species a provisional ADI (PADI) is established. Based on the NOEL of the dog study, 30 ppm (0.75 mg/kg/day), and applying a 1000 fold safety factor provides a PADI of 0.00075 mg/kg/day. The Maximum

Permissible Daily Intake (MPI) for a 60 kg person is 0.045 mg/day. Table 5 summarizes the Theoretical Maximum Residue Contribution (TMRC) for each of the published tolerances. The resulting percent of the PADI represented by the TMRC is 55.3.

Table 4. Approved Tolerances for PCNB in or on Agricultural Commodities

Crop	U.S. Tolerance (ppm)	Mexican Tolerance (ppm)	Mexican Processed Food	Canadian Tolerance (ppm)	Codex Alimentarius
Cottonseed	0.1	0.1	N/A	N/A	N/A
Peanuts	1.0	0.1	N/A	N/A	N/A
Bananas	0.1	N/A	N/A	N/A	N/A
Beans	0.1	0.1	N/A	N/A	N/A
Broccoli	0.1	0.1	N/A	N/A	N/A
Brussels sprouts	0.1	N/A	N/A	N/A	N/A
Cabbage	0.1	0.1	N/A	N/A	N/A
Cauliflower	0.1	N/A	N/A	N/A	N/A
Garlic	0.1	0.1	N/A	N/A	N/A
Peppers	0.1	0.1	N/A	N/A	N/A
Potatoes	0.1	0.1	N/A	N/A	N/A
Tomatoes	0.1	0.1	N/A	N/A	N/A

N/A = Not established

Table 5. Theoretical Maximum Residue Contribution of Approved Tolerances for PCNB in or on Raw Agricultural Comodities (CFR §180.291 and 319)

Crop	Tolerance (ppm)	Food Factor*	mg/day (1.5 kg diet)**
Cottonseed	0.1	0.15	0.00022
Peanuts	1.0	0.36	0.00537
Bananas	0.1	1.42	0.00213
Beans	0.1	2.04	0.00306
Broccoli	0.1	0.10	0.00015
Brussels sprouts	0.1	0.03	0.00005
Cabbage	0.1	0.74	0.00110
Cauliflower	0.1	0.07	0.00011
Garlic	0.1	0.03	0.00015
Peppers	0.1	0.12	0.00018
Potatoes	0.1	5.43	0.00314
Tomatoes	0.1	2.87	0.00431

TMRC = 0.02487 mg/day

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*The food factor is the percentage of a 1.5 kg daily diet represented by a given crop.

**mg/day = 1.5 kg diet X food factor X tolerance (ppm).

IV. REGULATORY POSITION AND RATIONALE.

A. Regulatory Positions

Based on the review and evaluation of available data and other relevant information on Pentachloronitrobenzene (PCNB), the Agency has made the following determinations:

1. Special Review

The Agency will not place PCNB and its major contaminant, hexachlorobenzene (HCB) into Special Review at this time [40 CFR, Section 154.7(a)(2)].

Rationale: PCNB was previously placed in Special Review by the Agency in October 1977, because of its oncogenic potential in mice. The Agency subsequently included HCB in its consideration of the pesticide's oncogenic potential.

Although the data base is inadequate to completely assess the oncogenic potential of PCNB, the Agency has concluded that the oncogenic effects associated with commercially produced PCNB are likely to be due to the presence of its contaminant, hexachlorobenzene (HCB). PCNB has been classified as a Group D carcinogen (inadequate evidence of carcinogenicity in animals).

HCB has been classified as a Group B_2 carcinogen (probable human carcinogen). The registrants of PCNB agreed to reduce the HCB levels in technical PCNB as a condition of continued registration. Thus, if the level of HCB contamination were reduced in commercially produced PCNB, the risk associated with exposure to PCNB would also be reduced.

At the reduced HCB contamination levels, PCNB does not meet any of the criteria for intiation of a Special Review at this time. The risk estimates for PCNB, with 0.1% HCB contaminant level, for applicators ranged from 10^{-5} to 10^{-6} and were based on 100% dermal absorption (in the absence of data). Additional data are required to completely assess the oncogenic potential of PCNB. Upon receipt and review of these data, the Agency will determine if additional regulatory action is needed.

2. Compliance with the Conditions in Notice of Determination of April 28, 1982

Registrants are required to comply with the conditions agreed to and published in the Notice of Determination Concluding the Rebuttable Presumption Against Registration of April 28, 1982.

Rationale: Presented below are the risk reduction measures the PCNB registrants agreed to adopt. These measures were conditions to the continued registration of PCNB products. These measures collectively will minimize exposure to PCNB and HCB while additional data to completely assess the risk associated with the continued use of PCNB are generated.

a. Required for Manufacturing-Use Products

(1). Implement new technology to lower the HCB level in PCNB to 0.1 percent or less by April, 1988.

(2). Complete a residue study of PCNB and HCB levels in potatoes after processing to determine if PCNB and HCB levels concentrate in processed foods and whether a tolerance is needed under Section 409 of FFDCA. The study was submitted and found to be inadequate by the Agency. Therefore, the study must be repeated and submitted to the Agency by January 1989.

b. Required for End-Use Products

(1). Amend labels on granular formulations registered for use in parks and on golf courses to minimize contamination of potable water supplies.

(2). Amend labels on homeowner products to include a warning to avoid contact with skin by wearing protective clothing and recommending washing hands after using the product to minimize the user's exposure to PCNB.

(3). Amend labels for professional applicator products to include protective clothing and respirator requirements to minimize the user's exposure to PCNB during mixing/loading procedures.

3. Interim Tolerances

The Agency does not at this time intend to establish new food additive regulations for PCNB pursuant to Section 409 of the Federal, Food, Drug, and Cosmetic Act [FFDCA]. It will defer action on established food additive regulations until receipt and evaluation of residue data.

Rationale: Section 409 of the FFDCA bars the establishment of food additive regulations for substances which induce cancer in man or test animals. HCB, a contaminant of PCNB induces oncogenic responses in test animals.

4. Rotational Crop Restrictions

The Agency has determined that in order to remain in compliance with FIFRA, registrants must relabel their products to impose a 12 month restriction on root crops which are planted on a rotational basis. The extent of the restrictions will be reconsidered when additional data are submitted and reviewed.

Rationale: Preliminary data indicate that peanuts may bear detectable residues of PCNB if planted in rotation where a broadcast application was made eight months earlier. An interim prohibition against rotating root crops for 12 months after broadcast and banding applications will serve to protect the public from impermissable residues in root crops. There are no data available at this time to prohibit the rotation of non-root crops following broadcast treatment or root crops following either seed or transplant treatment with PCNB. Data on rotational crops are required in this standard.

5. Non-Target Organisms

The Agency has determined that in order to remain in compliance with FIFRA, registrants must relabel their products to include precautions for hazards to fish and other aquatic organisms in order to prevent unreasonable adverse effects on the environment. These label requirements are specified in Section D of this Part.

Rationale: PCNB is toxic to aquatic organisms in laboratory studies. Label precautions are provided to alert the user to the potential for adverse effects on aquatic organisms.

6. Reentry/Clothing Requirements

The Agency has determined that re-entry intervals or protective clothing requirements for non-applicators are not necessary.

Rationale: The toxicity of this compound does not warrant concern about exposure of non-applicators, such as workers re-entering a treated field, according to the criteria of 40 CFR Part 158.140. PCNB is in Toxicity Category III for acute effects, and no chronic health concerns of significance have been identified. In addition, the Agency has concluded that the exposure likely to result from the registered uses of this pesticide at recommended label rates would not pose significant risks of dermal or ocular irritation or sensitization effects for agricultural workers or other persons not applying or handling concentrated formulations of these pesticides, because of the degree of dilution involved in applied formulations.

7. New Uses

The Agency will not register any significant new uses for PCNB products until the chronic feeding and oncogenicity studies required in the Registration Standard are submitted and reviewed.

Rationale: The Agency has decided to allow the continued registrations of currently registered PCNB products but not register any additional significant new uses of PCNB until the chronic data base is complete.

8. FIFRA Requirements

While the data gaps are being filled, currently registered MPs and EPs containing PCNB as the sole active ingredient may be sold, distributed, formulated and used in the United States, subject to the terms and conditions specified in this Standard. Registrants must provide and agree to develop additional data, as specified in the Data Appendices of this guidance document, in order to maintain existing registrations.

Rationale: Under FIFRA, the Agency may elect not to cancel or withhold registration simply because data are missing or inadequate (see FIFRA sec. 3(c)(2)(B) and 3(c)(7)). Issuance of this Standard provides a mechanism for identifying data needs. These data will be evaluated, after which the Agency will determine if additional regulatory changes are necessary.

B. Criteria For Registration Under This Document

To be registered or reregistered under this Standard, products must contain PCNB as the sole active ingredient, bear required labeling, and conform to the product composition, acute toxicity limits, and use pattern requirements listed in this section.

C. Acceptable Ranges And Limits

1. Product Composition Standard

To be registered or reregistered under this Standard, manufacturing-use products (MPs) must contain PCNB as the sole active ingredient and HCB at a level $\leq$ 0.1% by April, 1988. Each MP formulation proposed for registration must be fully described with an appropriate certification of limits, stating maximum and minimum amounts of the active ingredient and inert ingredients which are present in products, as well as impurities found at greater than 0.1%.

2. Acute Toxicity Limits

The Agency will consider registration of technical grade and manufacturing-use products containing PCNB provided that the product labeling bears appropriate precautionary statements for the acute toxicity category in which each product is placed.

3. Use Patterns

To be registered under this Standard, manufacturing-use products must be labeled for formulation into end-use products only for the commodities listed below. The EPA Index to Pesticide Chemicals lists all registered uses, as well as approved maximum application rates and frequencies.

-Terrestrial, non-domestic, food uses on: field crops, vegetable crops, and seed treatments;

-Terrestrial, non-domestic, non-food uses on: ornamentals including rose bushes and turf.

D. Required Labeling

To be registered under this standard, all manufacturing-use and end-use PCNB products must bear appropriate labeling as specified in 40 CFR 162.10, and below. Appendix II contains information on label requirements.

Pesticide products containing PCNB released for shipment by a registrant or producer of that product after January 30, 1988, are required to bear an amended label which complies with the requirements of this Standard.

Pesticide products containing PCNB which are distributed, sold, offered for sale, held for sale, shipped, delivered for shipment, or received and (having been so received) delivered or offered to be delivered by any person after January 30, 1989, are required to bear an amended label which complies with the requirements of this Standard.

The following information must appear on the labeling within the time limits specified above:

1. Ingredient Statement

The ingredient statement for all MPs and EPs must list the active ingredient in the following manner:

Pentachloronitrobenzene (PCNB) .... % .

2. Use Pattern Statements

All manufacturing-use products containing PCNB must state that they are intended for formulation into end-use products for only the aforementioned use patterns. Labeling must specify sites for each registered use pattern. However, no use may be included on the label if the registrant fails to comply with the data requirements for that use pattern, as listed in Table A of the Data Appendices of this document.

2. Precautionary Statements

a. Manufacturing-use Product Statements

All PCNB products intended for formulation into end-use products must bear the following statements:

"This pesticide is toxic to fish and aquatic organisms. Do not discharge effluent containing this product into lakes, streams, ponds, estuaries, oceans, or public water unless this product is specifically identified and addressed in an NPDES permit. Do not discharge effluent containing this product into sewer systems without previously notifying the sewage treatment plant authority. For guidance, contact your State Water Board or Regional Office of the EPA."

b. End-use Product Statements

1) The precautionary statements must appear on the following EP labels:

° Amend labels for granular formulations used in parks and on golf courses to include the following precautionary statement:

"Do not apply directly adjacent to potable water supplies."

° Amend labels for homeowner products to include the following precautionary statement:

"Avoid contact with skin by wearing the following protective clothing: wear gloves, long-sleeved shirt, long pants, socks and shoes. Wash hands thoroughly after using."

° Amend labels for professional applicator products to include the following protective clothing requirements during mixing/loading procedures:

"Granular formulations: wear gloves, long-sleeved shirt, long pants, socks and shoes";

"Emulsifiable concentrate and liquid formulations: wear respirator, gloves, long-sleeved shirt, long pants, socks and shoes";

"Dust based formulations used as a planter box seed-treatment: wear dust mask, gloves, long-sleeved shirt, long pants, socks and shoes."

2) The following environmental precautionary statements must appear on all Non-seed Treatment and Non-granular EP labels for Outdoor Uses:

"This pesticide is toxic to fish and aquatic organisms. Drift and runoff from treated areas may be hazardous to fish and aquatic organisms in adjacent aquatic sites. Do not apply directly to water or wetlands (swamps, bogs, marshes, and potholes). Do not contaminate water or wetlands by cleaning of equipment or disposal of wastes."

3) The following environmental precautionary statements must appear on all Seed Treatment or Granular EP labels for Outdoor uses:

"This pesticide is toxic to fish and aquatic organisms. Cover or incorporate treated seeds (granules). Do not contaminate water or wetlands by cleaning of equipment or disposal of wastes."

4) The following restriction on rotational crops must appear on the label of all EPs:

"Do not plant root crops in PCNB treated fields within 12 months of broadcast and banding applications unless PCNB is registered for use on those crops."

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V. PRODUCTS SUBJECT TO THIS STANDARD

All products containing one or more of the pesticides identified in Section II.A. are subject to certain requirements for data submission or changes in composition, labeling or packaging of the product. The applicable requirements depend on whether the product is a manufacturing or end use product and whether the pesticide is the sole active ingredient or one of multiple active ingredients.

Products are subject to this Registration Standard as follows:

A. Manufacturing use products containing this pesticide as the sole active ingredient are subject to:

1. The restrictions (if any) upon use, composition, or packaging listed in Section IV, if they pertain to the manufacturing use product.

2. The data requirements listed in Tables A and B[2]

3. The labeling requirements specified for manufacturing use products in Section IV.

4. Administrative requirements (application forms, Confidential Statement of Formula, data compensation provisions) associated with reregistration.

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[2] Data requirements are listed in the three Tables in Appendix I of this Registration Standard. The Guide to Tables in that Appendix explains how to read the Tables.

Table A lists generic data requirements applicable to all products containing the pesticide subject to this Registration Standard. Table B lists product-specific data applicable to manufacturing use products. The data in Tables A and B need not be submitted by a producer who is eligible for the formulator's exemption for that active ingredient.

Table C lists product-specific data applicable to end use products. The Agency has decided that, in most cases, it will not require the submission of product-specific data for end use products at this time. Therefore most Registration Standards do not contain a Table C.

B. Manufacturing use products containing this pesticide as one of multiple active ingredients are subject to:

The data requirements listed in Table A.

C. End use products containing this pesticide as the sole active ingredient are subject to:

1. The restrictions (if any) upon use, composition, or packaging listed in Section IV if they pertain to the end use product.

2. If eligible for the formulator's exemption[3], the data requirements listed in Table C.

3. If not eligible for the formulator's exemption, the data requirements listed in Table A and the data requirements listed in Table C.

4. The labeling requirements specified for end use products in Section IV.

D. End use products containing this pesticide as one of multiple active ingredients are subject to:

a. If not eligible for the formulator's exemption, the date requirements listed in Tables A and C.

b. If eligible for the formulator's exemption, the data requirements listed in Table C.

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[3] If you purchase from another producer and use as the source of your active ingredient only EPA-registered products, you are eligible for the formulator's exemption for generic data concerning that active ingredient (Table A) and product-specific data for the registered manufacturing use product you purchase (Table B).

Two circumstances nullify this exemption:

1) If you change sources of active ingredient to an unregistered product, formulate your own active ingredient, or acquire your active ingredient from a firm with ownership in common with yours, you individually lose the exemption and become subject to the data requirements in Table A.

2) If no producer subject to the generic data requirements in Table A agrees to submit the required data, all end use producers lose the exemption, and become subject to those data requirements.

VI. REQUIREMENT FOR SUBMISSION OF GENERIC DATA

This portion of the Registration Standard is a notice issued under the authority of FIFRA sec. 3(c)(2)(B). It refers to the data listed in Table A, which are required to be submitted by registrants to maintain in effect the registration of products containing this active ingredient.[4]

A. What are generic data?

Generic data pertain to the properties or effects of a particular active ingredient. Such data are relevant to an evaluation of all products containing that active ingredient regardless of whether the product contains other ingredients. (unless the product bears labeling that would make the data requirement inapplicable).

Generic data may also be data on a "typical formulation" of a product. "Typical formulation" testing is often required for ecological effects studies and applies to all products having that formulation type. These are classed as generic data, and are contained in Table A.

B. Who must submit generic data?

All current registrants are responsible for submitting generic data in response to a data request under FIFRA sec. 3(c)(2)(B) (DCI Notice). EPA has decided, however, not to require a registrant who qualifies for the formulator's exemption (FIFRA sec. 3(c)(2)(D) and § 152.85) to submit generic data in response to a DCI notice if the registrant who supplies the active ingredient in his product is complying with the data request.

If you are not now eligible for a formulator's exemption, you may qualify for one if you change your source of supply to a registered source that does not share ownership in common with your firm. If you choose to change sources of supply, the Confidential Statement of Formula must identify the new source(s) and you must submit a Formulator's Exemption Statement form.

If you apply for a new registration for products containing this active ingredient after the issuance of this Registration Standard, you will be required to submit or cite generic data relevant to the uses of your product if, at the time the application is submitted, the data have been submitted to the Agency by current registrants. If the required data have not yet been submitted, any new registration will be conditioned upon the new registrant's submission or citation of the required data not later than the date upon which current registrants of similar products are required to provide such data. See FIFRA sec. 3(c)(7)(A). If you thereafter fail to comply with the condition of that registration to provide data, the registration may be cancelled (FIFRA sec. 6(e)).

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[4] Registrations granted after issuance of this Standard will be conditioned upon submission or citation of the data listed in this Registration Standard.

C. What generic data must be submitted?

You may determine which generic data you must submit by consulting Table A. That table lists the generic data needed to evaluate current uses of all products containing this active ingredient, the uses for which such data are required, and the dates by which the data must be submitted to the Agency.

D. How to comply with DCI requirements.

Within 90 days of your receipt of this Registration Standard, you must submit to EPA a completed copy of the form entitled "FIFRA Section 3(c)(2)(B) Summary Sheet" (EPA Form 8580-1, enclosed) for each of your products. On that form you must state which of the following six methods you will use to comply with the DCI requirements:

1. You will submit the data yourself.

2. You have entered into an agreement with one or more registrants to jointly develop (or share in the cost of developing) the data, but will not be submitting the data yourself. If you use this method, you must state who will submit the data on which you will rely. You must also provide EPA with documentary evidence that an agreement has been formed which allows you to rely upon the data to be submitted. Such evidence may be: (1) your letter offering to join in an agreement and the other registrant's acceptance of your offer, (2) a written statement by the parties that an agreement exists, or (3) a written statement by the person who will be submitting the data that you may rely upon its submission. The Agency will also require adequate assurance that the person whom you state will provide the data is taking appropriate steps to secure it. The agreement to produce the data need not specify all of the terms of the final arrangement between the parties or a mechanism to resolve the terms.

3. You have attempted to enter into an agreement to jointly develop data, but no other registrant has accepted your offer. You request that EPA not suspend your registration for non-compliance with the DCI. EPA has determined that, as a general policy, it will not suspend the registration of a product when the registrant has in good faith sought and continues to seek to enter into a data development/cost sharing program, but the other registrants developing the data have refused to accept its offer. [If your offer is accepted, you may qualify for Option 2 above by entering into an agreement to supply the data.]

In order to qualify for this method, you must:

1. File with EPA a completed "Certification of Attempt to Enter into an Agreement with other Registrants for Development of Data" (EPA Form 8580-6, enclosed).

2. Provide us with a copy of your offer to the other registrant and proof of the other registrant's receipt of your offer (such as a certified mail receipt). Your offer must, at a minimum, contain the following language or its equivalent:

> [Your company name] offers to share in the burden of producing the data required pursuant to FIFRA sec. 3(c)(2)(B) in the [name of active ingredient] Registration Standard upon terms to be agreed or failing agreement to be bound by binding arbitration as provided by FIFRA section 3(c)(2)(B)(iii).

The remainder of your offer may not in any way attempt to limit this commitment. If the other registrant to whom your offer is made does not accept your offer, and if the other registrant informs us on a DCI Summary Sheet that he will develop and submit the data required under the DCI, then you may qualify for this option. In order for you to avoid suspension under this method, you may not later withdraw or limit your offer to share in the burden of developing the data. In addition, the other registrant must fulfill its commitment to develop and submit the data.

4. You request a waiver of the data requirement. If you believe that a data requirement does not (or should not) apply to your product or its uses, you must provide EPA with a statement of the reasons why you believe this is so. Your statement must address the specific composition or use factors that lead you to believe that a requirement does not apply. Since the Agency has carefully considered the composition and uses of pesticide products in determining that a data requirement applies, EPA does not anticipate that many waivers will be granted. A request for waiver does not extend the timeframes for developing required data, and if your waiver request is denied, your registration may be suspended if you fail to submit the data.

5. You request that EPA amend your registration by deleting the uses for which the data are needed. You are not required to submit data for uses which are no longer on your label.

6. You request voluntary cancellation of the registration of your product(s) for which the data are needed.

E. Procedures for requesting a change in testing protocol.

If you will generate the required data and plan to use test procedures which deviate from (or are not specified in) either EPA's Pesticide Assessment Guidelines or the Reports of Expert Groups to the Chemicals Group, Organization for Economic Cooperation and Development (OECD) Chemicals Testing Programme, you must submit for EPA approval the protocols you propose to use.

You should submit your protocols before beginning testing and await EPA approval, because the Agency will not ordinarily accept as sufficient studies using unapproved protocols. A request for protocol approval will not extend the timeframe for submission of the data, nor will extensions generally be given to conduct studies due to submittal of inappropriate protocols.

F. Procedures for requesting extensions of time.

If you think that you will need more time to generate the data than is allowed by EPA's schedule, you may submit a request for an extension of time. Any request for a time extension which is made as an initial response to a section 3(c)(2)(B) request notice must be submitted in writing to the Product Manager listed at the end of this section and must be made before the deadline for response. Once dates have been committed to and EPA has accepted these commitments, any subsequent requests for a time extension must be submitted in writing to the Office of Compliance Monitoring.

EPA will view failure to request an extension before the response deadline as a waiver of any future claim that there was insufficient time to submit the data. While EPA considers your request, you must strive to meet the deadline for submitting the data.

The extension request should state the reasons why you believe that an extension is necessary and the steps you have taken to meet the testing deadline. Time extensions normally will not be granted due to problems with laboratory capacity or adequacy of funding, since the Agency believes that with proper planning these can be overcome. Time extensions may be considered when joint data development is planned, or when the Agency must approve a new or modified protocol before the study can be begun.

A request for an extension does not extend the timeframe for submission of the data. If EPA denies your request for a time extension and you do not submit the data as requested, EPA may begin proceedings to suspend the registrations of your products.

G. Existing stocks provision upon suspension or cancellation.

The Agency has determined that if a registration is suspended for failure to respond to a DCI request under FIFRA sec. 3(c)(2)(B), an existing stocks provision is not consistent with the Act. Accordingly, the Agency does not anticipate granting permission to sell or distribute existing stocks of suspended product except in rare circumstances. If you believe that your product will be suspended or cancelled and that an existing stocks provision should be granted, you have the burden of clearly demonstrating to EPA that granting such permission would be consistent with the Act. The following information must be included in any request for an existing stocks provision:

1. Explanation of why an existing stocks provision is necessary, including a statement of the quantity of existing stocks and your estimate of the time required for their sale or distribution; and

2. Demonstration that such a provision would be consistent with the provisions of FIFRA.

VII. REQUIREMENT FOR SUBMISSION OF PRODUCT-SPECIFIC DATA

Under its DCI authority, EPA has determined that certain product-specific data are required to maintain your registrations in effect. Product-specific data are derived from testing using a specific formulated product, and, unlike generic data, generally support only the registration of that product. All such data must be submitted by the dates specified in this Registration Standard.

If you have a manufacturing use product, these data are listed in Table B. If you have an end use product, the data are listed in Table C. As noted earlier, the Agency has decided that it will not routinely require product-specific data for end use products at this time. Therefore, Table C may not be contained in this Registration Standard; if there is no Table C, you are not required to submit the data at this time.

In order to comply with the product specific data requirements, you must follow the same procedures as for generic data. See Section VI.D, E, F, and G. You should note, however, that product chemistry data are required for every product, and the only acceptable responses are options VI.D.1. (submit data) or VI.D.6.(cancellation of registration).

Failure to comply with the product-specific data requirements for your products will result in suspension of the product's registration.

VIII. REQUIREMENT FOR SUBMISSION OF REVISED LABELING

FIFRA requires each product to be labeled with accurate, complete and sufficient instructions and precautions, reflecting the Agency's assessment of the data supporting the product and its uses. General labeling requirements are set out in 40 CFR 162.10 (see Appendix II - LABELING and SUMMARY). In addition, labeling requirements specific to products containing this pesticide are specified in Section VI.D of this Registration Standard. Applications submitted in response to this notice must include draft labeling for Agency review.

If you fail to submit revised labeling as required, which complies with 40 CFR 162.10 and the specific instructions in Section VI.D., EPA may seek to cancel or suspend the registration of your product under FIFRA sec. 6.

IX. INSTRUCTIONS FOR SUBMISSION

A. Manufacturing Use Products (MUPs) containing PCNB as sole active ingredient.

1. Within 90 days from receipt of this document, you must submit to the Product Manager in the Registration Division for each product subject to this Registration Standard:

a. The "FIFRA Section 3(c)(2)(B) Summary Sheet" (EPA Form 8580-1), with appropriate attachments.[5]

b. Confidential Statement of Formula (EPA Form 8570-4).

c. Formulator's Exemption Statement (EPA Form 8570-27), if applicable.

d. Evidence of compliance with data compensation requirements of FIFRA sec. 3(c)(1)(D). Refer to 40 CFR 152.80-152.99.

2. Within 9 months from receipt of this document you must submit to the Product Manager:

a. Application for Pesticide Registration (EPA Form 8570-1).

b. Two copies of any required product-specific data (See Table B).

c. Three copies of draft labeling, including the container label and any associated supplemental labeling. Labeling should be either typewritten text on 8-1/2 x 11 inch paper or a mockup of the labeling suitable for storage in 8-1/2 x 11 files. The draft label must indicate the intended colors of the final label, clear indication of the front panel of the label, and the intended type sizes of the text.

d. Product Specific Data Report (EPA Form 8580-4).

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[5] If on the Summary Sheet, you commit to develop the data, present arguments that a data requirement is not applicable or should be waived, or submit protocols or modified protocols for Agency review, you must submit a copy of the Summary Sheet (and any supporting information) to the Office of Compliance Monitoring, which will be monitoring the data generated in response to this notice. This submission is in addition to responding to the Product Manager, and should be submitted to the Office of Compliance Monitoring at the address given at the end of this section. (Actual studies are not to be submitted to the Office of Compliance Monitoring.)

3. Within the times set forth in Table A, you must submit to the Registration Division all generic data, unless you are eligible for the formulator's exemption. If for any reason any test is delayed or aborted so that the schedule cannot be met, immediately notify the Product Manager and the Office of Compliance Monitoring of the problem, the reasons for the problem, and your proposed course of action.

B. Manufacturing Use Products containing PCNB in combination with other active ingredients.

1. Within 90 days from receipt of this document, you must submit to the Product Manager in the Registration Division:

a. FIFRA sec. 3(c)(2)(B) Summary Sheet, with appropriate attachments[5] (EPA Form 8580-1).

b. Confidential Statement of Formula (EPA Form 8570-4)

c. Formulator's Exemption Statement (EPA Form 8570-27), if applicable.

2. Within the time frames set forth in Table A, you must submit to the Registration Division all generic data, unless you are eligible for the formulator's exemption. If for any reason any test is delayed or aborted so that the schedule cannot be met, immediately notify the Product Manager and the Office of Compliance Monitoring of the problem, the reasons for the problem, and your proposed course of action.

C. End Use Products containing PCNB as sole active ingredient.

1. Within 90 days from receipt of this document, you must submit to the Product Manager in the Registration Division:

a. FIFRA Section 3(c)(2)(B) Summary Sheet, with appropriate attachments[5] (EPA Form 8580-1).

b. Confidential Statement of Formula (EPA Form 8570-4).

c. Formulator's Exemption Statement (EPA Form 8570-27), if applicable.

2. Within 9 months from receipt of this document you must submit to the Product Manager:

a. Two copies of any product-specific data, if required by Table C.

b. Product Specific Data Report (EPA Form 8580-4), if Table C lists required product-specific data.

c. Three copies of draft labeling, including the container label and any associated supplemental labeling. Labeling should be either typewritten text on 8-1/2 x 11 inch paper or a mockup of the labeling suitable for storage in 8-1/2 x 11 files. The draft labeling must indicate the intended colors of the final label, clear indication of the front panel of the label, and the intended type sizes of the text. End use product labeling must comply specifically with the instructions in Section IV (Regulatory Position and Rationale).

D. Intrastate Products containing PCNB either as sole active ingredient or in combination with other active ingredients.

These products are being called in for full Federal registration. Producers of these products are being sent a letter instructing them how to submit an application for registration.

E. Addresses

The required information must be submitted to the following address:

Lois Rossi, Product Manager 21
Registration Division (TS-767C)
Office of Pesticide Programs
Environmental Protection Agency
401 M St., SW
Washington, D.C. 20460

The address for submissions to the Office of Compliance Monitoring is:

Laboratory Data Integrity Program
Office of Compliance Monitoring (EN-342)
Environmental Protection Agency
401 M St., SW
Washington, D.C. 20460.

GUIDE TO TABLES

Tables A, B, and C contain listings of data requirements for the pesticides covered by this Registration Standard.

Table A contains generic data requirements that apply to the pesticide in all products, including data requirements for which a "typical formulation" is the test substance.

Table B contains product-specific data requirements that apply only to a manufacturing use product.

Table C contains product-specific data requirements that apply only to an end use product.

The data tables are generally organized according to the following format:

1. Data Requirement (Column 1). The data requirements are listed in the order in which they appear in 40 CFR Part 158. The reference numbers accompanying each test refer to the test protocols set out in the Pesticide Assessment Guidelines, which are available from the National Technical Information Service, 5285 Port Royal Road, Springfield, VA 22161.

2. Test Substance (Column 2). This column lists the composition of the test substance required to be used for the test, as follows:

TGAI = Technical grade of the active ingredient, PCNB, containing a HCB contaminant level of 0.07 percent.

PAI = Pure active ingredient
PAIRA = Pure active ingredient, radio labeled
TEP = Typical end use formulation
MP = Manufacturing use product
EP = End use product

Any other test substances, such as metabolites, will be specifically named in Column 2 or in footnotes to the table.

3. Use pattern (Column 3). This column indicates the use patterns to which the data requirement applies. Use patterns are the same as those given in 40 CFR Part 158. The following letter designations are used for the given use patterns:

A = Terrestrial, food
B = Terrestrial, non-food
C = Aquatic, food
D = Aquatic, non-food
E = Greenhouse, food
F = Greenhouse, non-food
G = Forestry
H = Domestic outdoor
I = Indoor

Any other designations will be defined in a footnote to the table.

4. Does EPA have data? (Column 4). This column indicates one of three answers:

> YES - EPA has data in its files that completely satisfy this data requirement. These data may be cited by other registrants in accordance with data compensation requirements of Part 152, Subpart E.
>
> PARTIALLY - EPA has some data in its files, but such data do not fully satisfy the data requirement. In some cases, the Agency may possess data on one of two required species, or may possess data on one test substance but not all. The term may also indicate that the data available to EPA are incomplete. In this case, when the data are clarified, or additional details of the testing submitted by the original data submitter, the data may be determined to be acceptable. If this is the case, a footnote to the table will usually say so.
>
> NO - EPA either possesses no data which are sufficient to fulfill the data requirement, or the data which EPA does possess are flawed scientifically in a manner that cannot be remedied by clarification or additional information.

5. Bibliographic citation (Column 5). If the Agency has acceptable data in its files, this column lists the identifying number of each study. This normally is the Master Record Identification (MRID) number, but may be a GS number if no MRID number has been assigned. Refer to the Bibliography Appendices for a complete citation of the study.

6. Must additional data be submitted? (Column 6). This column indicates whether the data must be submitted to the Agency. If column 3 indicates that the Agency already has data, this column will usually indicate NO. If column 3 indicates that the Agency has only partial data or no data, this column will usually indicate YES. In some cases, even though the Agency does not have the data, EPA will not require its submission because of the unique characteristics of the chemical; because data on another chemical can be used to fulfill the data requirement; or because the data requirement has been waived or reserved. Any such unusual situations will be explained in a footnote to the table.

7. Timeframe for submission (Column 7). If column 5 requires that data be submitted, this column indicates when the data are to be submitted, based on the issuance date of the Registration Standard. The timeframes are those established either as a result of a previous Data Call-In letter, or standardized timeframes established by PR Notice 85-5 (August 22, 1985).

8. Footnotes (at the end of each table). Self-explanatory.

TABLE A

GENERIC DATA REQUIREMENTS FOR PCNB: [97% TECHNICAL, EPA REG. NO. 2749-9], [96% TECHNICAL, EPA REG. NO. 10820-1]
[96% TECHNICAL, EPA REG. NO. 400-401], [95% TECHNICAL, EPA REG. NO. 5481-197]
[94% TECHNICAL, EPA REG. NO. 524-122]

Data Requirement	Test 1/ Substance	Use Patterns	Does EPA Have Data? 2/	Bibliographic Citation 2/	Must Additional Data be Submitted?	Time Frame for Submission
§158.120 Product Chemistry						
Product Identity						
61-1 - Product Identity & Disclosure of Ingredients	TGAI	All	No	N/A	Yes	6 Months
61-2 - Description of Beginning Materials & Manufacturing Process	TGAI	All	No	N/A	Yes 3/	April 1988
61-3 - Discussion of Formation of Impurities	TGAI	All	No	N/A	Yes 3/	April 1988
Analysis and Certification of Product Ingredients						
62-1 - Preliminary Analysis of Product Samples	TGAI	All	No	N/A	Yes	12 Months
62-2 - Certification of Ingredient Limits	TGAI	All	No	N/A	Yes	12 Months
62-3 - Analytical Methods to Verify Certified Limits	TGAI	All	No	N/A	Yes	12 Months
Physical and Chemical Characteristics						
63-2 - Color	TGAI	All	No	N/A	Yes	6 Months
63-3 - Physical State	TGAI	All	No	N/A	Yes	6 Months
63-4 - Odor	TGAI	All	No	N/A	Yes	6 Months
63-5 - Melting Point	TGAI	All	No	N/A	Yes	6 Months
63-6 - Boiling Point	TGAI	All	No	N/A	Yes	6 Months

TABLE A

GENERIC DATA REQUIREMENTS FOR PCNB: [97% TECHNICAL, EPA REG. NO. 2749-9], [96% TECHNICAL, EPA REG. NO. 10820-1]
[96% TECHNICAL, EPA REG. NO. 400-401], [95% TECHNICAL, EPA REG. NO. 5481-197]
[94% TECHNICAL, EPA REG. NO. 524-122]

Data Requirement	Test Substance	Use Patterns	Does EPA Have Data?2/	Bibliographic Citation2/	Must Additional Data be Submitted?	Time Frame for Submission
Physical and Chemical Characteristics (Continued)						
63-7 - Density, Bulk Density, or Specific Gravity	TGAI	All	No	N/A	Yes	6 Months
63-8 - Solubility	TGAI or PAI	All	No	N/A	Yes	6 Months
63-9 - Vapor Pressure	PAI	All	No	N/A	Yes	6 Months
63-10 - Dissociation constant	PAI	All	No	N/A	Yes	6 Months
63-11 - Octanol/water partition coefficient	PAI	All	No	N/A	Yes	6 Months
63-12 - pH	TGAI	All	No	N/A	Yes	6 Months
63-13 - Stability	TGAI	All	No	N/A	Yes	6 Months
Other Requirements:						
64-1 - Submittal of samples	TGAI, PAI	All	No		No4/	

1/ The PCNB test substance to be used as specified for each data requirement must be that substance which is currently produced and marketed.

2/ Not applicable. Although product chemistry data may have been submitted in the past, the Agency has determined that these data must be resubmitted for each pesticide. New requirements have been introduced and previously submitted data must be updated. Therefore bibliographic citations for the old data are not applicable.

3/ In accordance with the agreement between PCNB registrants and the Agency of April 28, 1982, registrants are required to submit an annual progress report summarizing efforts to implement HCB reduction measures. The registrants must implement new technology to lower the HCB contaminant level in technical PCNB to 0.1% or less by April 1988.

4/ The compound does not require submittal of samples at this time.

TABLE A
GENERIC DATA REQUIREMENTS FOR PCNB

Date Requirement	Test Substance	Use Patterns	Does EPA Have Data?	Bibliographic Citation	Must Additional Data be Submitted	Time Frame for Submission
§158.135 Toxicology						
ACUTE TESTING:						
81-1 - Acute Oral Toxicity - Rat	TGAI	A,B	Yes	00001555,	No	
81-2 - Acute Dermal Toxicity - Rabbit	TGAI	A,B	Yes	00001665, 00001668 00001870, 00114220	No	
81-3 - Acute Inhalation Toxicity - Rat	TGAI	A,B	Yes	00114203,	No	
81-4 - Eye Irritation - Rabbit	TGAI	A,B	Yes	00114203,	No	
81-5 - Dermal Irritation - Rabbit	TGAI	A,B	Yes	00001668, 00114220 00114222	No	
81-6 - Dermal Sensitization - Guinea Pig	TGAI	A,B	No	--	Yes	9 Months
81-7 - Acute Delayed Neurotoxicity - Hen	TGAI	A,B	No	—	No 1/	
SUBCHRONIC TESTING:						
82-1 - 90-Day Feeding: - Rodent, and	TGAI	A,B	Yes	GS128-003	No	
- Non-rodent (Dog)	TGAI	A,B	Yes	00114201	No 2/	
82-2 - 21-Day Dermal	TGAI	A,B	No	--	No 3/	
82-3 - 90-Day Dermal - Rabbit	TGAI	A,B	No	--	No 3/	

TABLE A
GENERIC DATA REQUIREMENTS FOR PCNB

Date Requirement	Test Substance	Use Patterns	Does EPA Have Data?	Bibliographic Citation	Must Additional Data be Submitted	Time Frame for Submission
SUBCHRONIC TESTING:						
82-4 - 90-Day Inhalation: - Rat	TGAI	A,B	No	--	No 4/	
82-5 - 90-Day Neurotoxicity: Hen/Mammal	TGAI	A,B	No	--	No 1/	
CHRONIC TESTING:						
83-1 - Chronic Toxicity - 2 species:						
- Rodent,	TGAI 10/	A,B	No		Yes 5/	July 1991
- Non-rodent (Dog)	TGAI	A,B	Yes	00114201, 00114232	No	
83-2 - Oncogenicity - 2 species:						
- Rat (preferred),	TGAI 10/	A,B	No		Yes 6/	July 1991
- Mouse (preferred)	TGAI	A,B	Yes	00114224, 00114226 05010016, GS128-003	No	
83-3 - Teratogenicity - 2 species:	TGAI 10/	A,B	Partially	00114199, 00114250	Yes 7/	March 1988
83-4 - Reproduction - Rat 2-generation	TGAI	A,B	Yes	00001666	No	

TABLE A
GENERIC DATA REQUIREMENTS FOR PCNB

Data Requirement	Test Substance	Use Patterns	Does EPA Have Data?	Bibliographic Citation	Must Additional Data be Submitted?	Time Frame for Submission
§158.135 Toxicology - Continued						
MUTAGENICITY TESTING						
84-2 - Gene Mutation (Ames Test)	TGAI	A,B	Yes	00114206, 05003752 05009139, GS128-003	No	
84-2 - Structural Chromosomal Aberration	TGAI	A,B	Partially	05009139, GS128-003	Reserved 8/	12 Months
84-2 - Other Mechanisms of Mutagenicity	TGAI	A,B	Yes	05009139, GS128-003	No	
SPECIAL TESTING						
85-1 - General Metabolism	PAI or PAIRA	A,B	Yes	00060561, 00097800 00114207, 00114208 00114209, 00114233 00114250, 00114251 00114256, 00129446	No	
85-2 - Dermal Penetration	Choice		No		No 9/	
86-1 - Domestic Animal Safety	Choice		No		No 9/	

TABLE A
GENERIC DATA REQUIREMENTS FOR PCNB

§158.135 Toxicology - Continued

1/ Technical PCNB is not an organophosphate or degradation product thereof, and it is not structurally related to a known acute delayed neurotoxic substance.

2/ The chronic feeding study in dogs (114201) satisfies the requirement for a subchronic study in a non-rodent.

3/ No direct application to the skin or prolonged dermal exposures are associated with uses of PCNB.

4/ Repeated inhalation exposure to toxic concentrations is not likely under normal use conditions.

5/ Generally low survival of test animals (<50%) in the long-term rat feeding study makes it unaceptable. The Agency expects to receive a new chronic toxicity study in July, 1991.

6/ Excessive toxicity or generally low survival of test animals in the long-term rat feeding studies makes the results inadequate for use in an assessment of PCNB's carcinogenic potential.

7/ Courtney et al (114250) tested a single dose level in small groups (5 to 7 rats per group). In another study (00114204), PCNB of unspecified purity was tested, and the results did not unequivocally support the conclusion that the highest dose tested caused maternal toxicity. No maternal data were reported for the low and mid-dose groups so a NOEL could not be established. In the third study (114199), no observations such as maternal body weight and food consumption were reported. No effects were noted in the study, and therefore, sufficiently high doses were not evaluated. Because of HCB's potential developmental toxicity (U.S. EPA, 1984) and the absence of any statement of maternal or fetal effects, a study in rats is needed. The available mouse study (114250) tested a single toxic cose, and therefore, cannot be used to establish a NOEL in a second species.

8/ Reserved: The chromosomal abberation study reported by NTP (1968) suggested that PCNB has an effect on chromosome structure in Chinese hamster ovary cells in vitro. Because there were no other incications of genotoxocity, and because the effects were not clearly dose-related, the NTP is conducting additional chromosomal abberation studies to confiem the earlier findings. Additional data may be needed if the results of the new studies confirm those of the first NTP chromosomal aberration study.

9/ PCNB use patterns in conjunction with the Guidelines indicate that these data are not required.

10/ In the Toxicology data requirements under Chronic Testing, the technical grade (TGAI) of PCNB to be used for testing laboratory animals must contain a HCB level equal to or less than 0.1 percent.

TABLE A
GENERIC DATA REQUIREMENTS FOR PCNB

Data Requirement	Test Substance	Use Patterns	Does EPA Have Data?	Bibliographic Citation	Must Additional Data be Submitted?	Time Frame for Submission
§158.130 Environmental Fate						
DEGRADATION STUDIES-LAB:						
161-1 - Hydrolysis	TGAI or PAIRA	A,B	No		Yes	9 Months
Photodegradation						
161-2 - In water	TGAI or PAIRA	A,B	No		Yes	9 Months
161-3 - On soil	TGAI or PAIRA	A,B	No		Yes	9 Months
161-4 - In Air	TGAI or PAIRA		No		No 1/	
METABOLISM STUDIES-LAB:						
162-1 - Aerobic Soil	TGAI or PAIRA	A,B	No		Yes	27 Months
162-2 - Anaerobic Soil	TGAI or PAIRA	A	No		Yes	27 Months
162-3 - Anaerobic Aquatic	TGAI or PAIRA		No		No 2/	
162-4 - Aerobic Aquatic	TGAI or PAIRA		No		No 2/	
MOBILITY STUDIES:						
163-1 - Leaching and Adsorption/Desorption	TGAI or PAIRA	A,B	Yes	00114168, 00114181,	No	
163-2 - Volatility (Lab)	TEP	A	No		Yes	12 Months
163-3 - Volatility (Field)	TEP	A	No		Reserved 3/	

TABLE A
GENERIC DATA REQUIREMENTS FOR PCNB

Data Requirement	Test Substance	Use Patterns	Does EPA Have Data?	Bibliographic Citation	Must Additional Data be Submitted?	Time Frame for Submission
§158.130 Environmental Fate - Continued						
DISSIPATION STUDIES-FIELD:						
164-1 - Soil	TEP	A,B	No		Yes	27 Months
164-2 - Aquatic (Sediment)			No		No 2/	
164-3 - Forestry			No		No 4/	
164-4 - Combination and Tank Mixes			No		No 5/	
164-5 - Soil, Long-term	TEP	A	No		Reserved 6/	
ACCUMULATION STUDIES:						
165-1 - Rotational Crops (Confined)	PAIRA	A	No		Yes	39 Months
165-2 - Rotational Crops (Field)	TEP	A	No		Reserved 7/	
165-3 - Irrigated Crops			No		No 2/	
165-4 - In Fish	TGAI or PAIRA	A,B	No		Yes	12 Months
165-5 - In Aquatic Non-Target Organisms	TEP	A,B	No		Yes	12 Months

TABLE A
GENERIC DATA REQUIREMENTS FOR PCNB

§158.130 Environmental Fate - Continued

1/ Data are not required because PCNB has low volatility.
2/ Data are not required because PCNB does not have aquatic or aquatic impact uses.
3/ Data are deferred, depending upon the results of laboratory volatility studies.
4/ Data are not required because PCNB does not have forestry uses.
5/ Data for combination products and/or tank mixes are not required for this standard.
6/ Required if residues do not reach 50% dissipation (164-1) prior to recommended subsequent application of PCNB.
7/ Data are deferred, depending upon results of confined accumulation studies.

TABLE A
GENERIC DATA REQUIREMENTS FOR PCNB

Data Requirement	Test1/ Substance	Use Patterns	Does EPA Have Data?	Bibliographic Citation	Must Additional Data be Submitted?	Time Frame for Submission
§158.125 Residue Chemistry						
171-2 - Chemical Identity	TGAI		No		Yes	6 Months
171-3 - Directions for Use	--					
171-4 - Nature of Residue (Metabolism)						
- Plants	PAIRA		Partially	00001679, 00002827 00114183, 00114184 00114185, 00114186 00114187,	Yes 2/	18 Months
- Livestock	PAIRA & Plant Metabolites		Partially	00114205, 00114966 00001678, 00097751	Yes 3/	18 Months
171-4 - Residue Analytical Methods						
- Plant residues	TGAI & Metabolites		Partially	00001570, 00001669 00001670, 00001707 00001862, 00028428 00053075, 00064197 00071342, 00097719 00097734, 00097735 00097738, 00097739 00097740, 00097741 00097791, 00106632	Yes 4/	15 months
- Animal residues	TGAI & Metabolites		Partially	00014327, 00109656	Yes 4/	15 months

TABLE A
GENERIC DATA REQUIREMENTS FOR PCNB

Data Requirement	Test1/ Substance	Use Patterns	Does EPA Have Data?	Bibliographic Citation	Must Additional Data be Submitted?	Time Frame for Submission
§158.125 Residue Chemistry						
171-4 - Storage Stability Data	PAI		Partially	00059120	Yes 5/	15 Months
171-4 - Magnitude of the Residue-						
a. Root & Tuber Vegetable 7/ o Potato						
-- Crop field trials	TEP		Partially	00001861, 00097742	Yes 6a/	18 Months
-- Processed Food/Feed	EP		Partially	00059933, 00129447 00156362, 00159016	Yes 6b/	August 1988
b. Bulb Vegetable 8/ o Garlic						
-- Crop field trials	TEP		Partially	00097786,	Yes 9/	18 Months
c. Leafy Vegetables 10/ o Lettuce						
-- Crop field trials	TEP		Partially	00097715, 00097764 Acc.115742	Yes 11/	18 Months
d. Brassica (Cole) Leafy Vegetables 16/ o Broccoli						
-- Crop field trials	TEP		Partially	00097736,	Yes 12/	18 Months

TABLE A
GENERIC DATA REQUIREMENTS FOR PCNB

Data Requirement	Test1/ Substance	Use Patterns	Does EPA Have Data?	Bibliographic Citation	Must Additional Data be Submitted?	Time Frame for Submission
§158.125 Residue Chemistry						
171-4 - Magnitude of the Residue-						
d. Brassica (Cole) Leafy Vegetables (continued)						
o Brussels Sprouts						
-- Crop field trials	TEP		No	-	Yes 13/	18 Months
o Cabbage						
-- Crop field trials	TEP		Partially	00001861, 00097720	Yes 14/	18 Months
o Cauliflower						
-- Crop field trials	TEP		No	-	Yes 15/	18 Months
e. Legume Vegetable 19/						
o Beans						
-- Crop field trials	TEP		Partially	00001861, 00097734 00097764, GS128-001	Yes 17/18/	18 Months
-- Processed Food/Feed	EP		No		Yes 17b/	18 Months
f. Fruiting Vegetables 22/ (Except Cucurbits)						
o Peppers						
-- Crop field trials	TEP		Partially	00097801,	Yes 20/	18 Months
o Tomatoes						
-- Crop field trials	TEP		Partially	00001861, 00097743	Yes 21a/	18 Months
-- Processed Food/Feed	EP		No		Yes 21b/	18 Months

TABLE A
GENERIC DATA REQUIREMENTS FOR PCNB

Data Requirement	Test1/ Substance	Use Patterns	Does EPA Have Data?	Bibliographic Citation	Must Additional Data be Submitted?	Time Frame for Submission
§158.125 Residue Chemistry						
171-4 - Magnitude of the Residue-						
g. Small Fruits & Berries	24/					
o Strawberries -- Crop field trials	TEP		Partially	00097733, GS128-002	Yes 23/	18 Months
h. Non-Grass Animal Feeds (Forage, Fodder, Straw & Hay)	27/					
o Alfalfa -- Crop field trials	TEP		Partially	00001707, 00097738	Yes 25/	18 Months
o Clover -- Crop field trials	TEP		Partially	00097738	Yes 26/	18 Months
i. Miscellaneous Commodities						
o Bananas -- Crop field trials	TEP		Partially	00097749, 00106632	Yes 28/	18 Months
o Cottonseed -- Crop field trials, Processed Food/Feed	TEP		Partially	00001704, 00002228 00028427, 00064194 00097740, 00109402	Yes 29/	18 Months

TABLE A
GENERIC DATA REQUIREMENTS FOR PCNB

Data Requirement	Test1/ Substance	Use Patterns	Does EPA Have Data?	Bibliographic Citation	Must Additional Data be Submitted?	Time Frame for Submission
§158.125 Residue Chemistry						
171-4 - Magnitude of the Residue-						
i. Miscellaneous Commodities (continued)						
o Peanuts						
-- Crop field trials	TEP		Partially	00001704, 00001859 00001862, 00031296 00103131, 00125805 GS128-003	Yes 30/31/	18 Months
-- Processed Food/Feed	EP		Partially	00059932, 00060784 00097741, GS128-003	Yes 32/	18 Months
j. Seed Treatments						
-- Field trials	TEP		Partially	00053075, 00059146 00059149, 00059155	Yes 33/34/	18 Months
k. Fat, Meat, Meat By-Products & Milk of Cattle, Goats, Hogs, Horses, & Sheep	TGAI or Plant Metabolites		Partially	00014326	Reserved 35/	
l. Fat, Meat, Meat By-Products & Eggs of Poultry	TGAI or Plant Metabolites		Partially	00097757, 00109656	Reserved 36/	

TABLE A
GENERIC DATA REQUIREMENTS FOR PCNB

Data Requirement	Test1/ Substance	Use Patterns	Does EPA Have Data?	Bibliographic Citation	Must Additional Data be Submitted?	Time Fra for Submission
§158.125 Residue Chemistry - Continued						
171-4 - Magnitude of the Residue - Residue Studies						
- Potable Water	EP		No		Reserved 37/	
- Fish	EP		No		Reserved 37/	
- Irrigated Crops	EP		No		Reserved 37/	
- Food Handling	EP		No		Reserved 37/	
171-5 - Reduction of Residue	Residue of Concern		No		Reserved 38/	
171-6 - Proposed Tolerance	Residue of Concern		No		Reserved 38/	
171-7 - Reasonable Grounds in Support of Petition	--		No		Reserved 38/	

§ 158.125 Residue Chemistry - Continued

1/ The PCNB test substance to be used as specified for each data requirement must be that substance which is currently produced and marketed.

2/ The nature of the residue in plants has not been adequately described. Therefore, the following data must be provided: Data reflecting the distribution and metabolism of benzene-labeled [^{14}C]PCNB in mature peanuts and peanut forage, cabbage, and potatoes following soil applications (timed according to registered uses) at rates sufficiently high to permit complete characterization of ^{14}C-residues. Analyses should include hydrolysis and reextraction of extracted plant residues and aqueous fractions to determine conjugated ^{14}C-residues. [^{14}C]PCNB-treated samples should also be analyzed by enforcement method(s) to ascertain that all metabolites and impurities of concern are adequately determined.

3/ The nature of the residue in animals has not been adequately described. Therefore, the following data must be submitted: Metabolism studies utilizing ruminants and poultry, dosed with benzene-labeled [^{14}C]PCNB for at least 3 days at a concentration in the total diet which will result in sufficient residues in the tissues, milk and eggs for characterization. Animals must be sacrificed within 24 hours of the final dose. Milk and eggs must be collected twice daily. The distribution and characterization of PCNB residues must be determined and quantitated in milk, muscle, fat, kidney and liver of cows, and in the eggs, muscle, fat, kidney and liver of poultry. Analyses should include hydrolysis and reextraction of extracted samples and aqueous fraction to determine any conjugated ^{14}C-residues. Samples from these studies must also be analyzed by the enforcement method(s) to ascertain that all metabolites and impurities of concern are adequately determined.

4/ The registrant must submit the following data: Complete descriptions of analytical methods, including validation data and representative chromatograms, for the detection and quantitation of all residues and impurities of concern in or on plant and animal commodities.

5/ No data have been submitted concerning the storage stability of PCNB in or on raw agricultural commodities from crops treated with PCNB. The following data are required:

a. Storage intervals and conditions must be provided for plant samples used to generate data to support the interim or established tolerances for residues of PCNB, per se, in or on the following commodities and their processed products: potatoes, a brassica leafy vegetable, beans, peppers, tomatoes, cottonseed and peanuts. These data must be accompanied by data depicting the percent decline in residues at the corresponding storage intervals under the reported conditions. On receipt of these data, the sufficiency of the data regarding tolerance assessment will be reevaluated.

b. Similarly, sample storage information and residue storage stability data must be reported for residues of PCNB, PCA, MPCPS, PCB and HCB (See page 5 of this Standard) in or on the crop and animal R.A.C.s for which tolerances are currently proposed.

c. All residue data requested in this Standard must be accompanied by data regarding storage length and conditions of storage of samples. These data must be accompanied by data depicting the stability of the residues of concern under the conditions and for the time intervals specified.

[illegible]

GENERIC DATA REQUIREMENTS FOR PCNB

§ 158.125 Residue Chemistry

6/ The following data are required for potatoes:

a. Studies depicting residues of concern in or on potatoes treated with the 10 or 30% G, 75% WP, or 24% EC formulation of PCNB applied (i) PPI (preplant incorporated) broadcast at 25 lb ai/A; and (ii) in-furrow at planting at a rate of 11.7 lb ai/field A (separate tests). Studies must be conducted in the following areas: CA, ID, OR/WA, MI/WI, MN/ND, ME and FL. This geographic distribution is representative of ca. 95% of U.S. potato production (Agricultural Statistics, 1983).

b. Submit a potato processing study following the RCB approved protocol as follows: (i) use a ca. 5x treatment rate (50 lb ai/field A applied in-furrow) to produce potatoes bearing measurable weathered residues of PCNB; (ii) submit complete field sample and storage information; (iii) process 50 lb each of untreated and treated potatoes into chips, granules, and flakes; (iv) submit complete descriptions of the processing procedures; (v) analyze samples for all residues of concern; (vi) submit complete descriptions of the analytical methods and limits of detection; (vii) submit chromatrograms and raw data for all analyses; and (viii) accurately report all raw and summary data, reflecting the reported analytical limits of detection. Appropriate food/feed additive tolerances must be proposed should residues concentrate in the processed products.

7/ To obtain a crop group tolerance, residue data would be required for potatoes (see footnotes 5a & 5b) as well as the additional Root and Tuber Vegetable crops, carrots, radishes and sugarbeets.

8/ To obtain a crop group tolerance, residue data would be required for the additional Bulb Vegetable crop, onions.

9/ The registrant must: clarify the current labeling for the in-furrow treatment by specifying the spray band width as well as the number of row feet per field A.

10/ To obtain a crop group tolerance, the registrant would have to propose a tolerance for the combined residues of concern in or on lettuce (leaf and head) and submit appropriate supportive data. Residue data would also be required for the additional Leafy Vegetable crops, celery and spinach.

TABLE A
GENERIC DATA REQUIREMENTS FOR PCNB

§ 158.125 Residue Chemistry

11/ The submitted data are insufficient for assessment of maximum expected residues of PCNB (per se) or the combined residues of PCNB, its metabolites PCA and MPCPS, and its impurities PCB and HCB in or on lettuce for the following reasons: (i) the data did not adequately represent the various registered formulations; (ii) the treatment regimens did not reflect those currently labeled; (iii) sample histories were not adequately reported; and (iv) much of the data did not represent the R.A.C.s because samples were routinely washed in water before analysis. Therefore, the registrant must either:

a. Propose a tolerance for the combined residues of PCNB and its metabolites and impurities of concern in or on lettuce and submit data to support that tolerance. Trials must be conducted in accordance with the current intrastate labels on both leaf and head lettuce in AZ using the 2 lb/ gal EC, in CA using the 40% D and 75% WP (in separate trials), and in TX using the 10% D. Samples must be collected at crop maturity and, for head lettuce, must include both untrimmed and fieldtrimmed heads. The manner and extent of trimming must be adequately described. Also, the registrant must propose label restrictions specifying a minimum treatment-to-harvest interval, which must be reflected by data. Finally, the registrant must clarify the current labeling for the banded treatments by specifying the number of treated row feet/field A, in addition to the spray band width, or

b. Cancel the current intrastate registrations (AZ State Reg. No. N; CA State Reg. No. 10972-50043 AA and 10972-50199 AA; and TX State Reg. No. 74).

12/ Additional data are required for broccoli:

a. Data for the combined residues of PCNB and its metabolites and impurities of concern in or on broccoli treated with 75% WP and 10% G formulations (in separate treatments) in a broadcast incorporated treatment at ca. 60 lb ai/A before transplanting; and incorporated in a 12-15 inch band at 40 lb ai/field A (13,000 row feet) at transplanting. Data are also required from trials conducted with the 75% WP applied at ca. 60 lb ai/field A in a transplant solution according to the current label. Trials must be conducted at one OR and two CA (one trial each in the central coast area and Imperial Valley) sites; or in one location each in CA (central coast), OR and TX to adequately represent the commercial production areas of broccoli in the U.S. (Agricultural Statistics, 1984).

b. The registrant must also propose a label restriction limiting the maximum annual application rate, which must be reflected by the data.

TABLE A
GENERIC DATA REQUIREMENTS FOR PCNB

§ 158.125 Residue Chemistry

13/ No data were submitted regarding residues of PCNB, its metabolites or its impurities in or on brussels sprouts. However, the tests are not required because data required for broccoli and/or cabbage will also be used for brussel sprouts.

14/ Additional data are required for cabbage:

a. Data for the combined residues of PCNB and its metabolites and impurities of concern in or on cabbage (with and without wrapper leaves) from trials conducted with 75% WP and 10% G formulations (in separate treatments) broadcast at ca. 60 lb ai/A and incorporated before transplanting; and incorporated in a 12-15 inch band at 40 lb ai/ field A (13,000 row feet) at transplanting. Data are also required from trials conducted with the 75% WP applied at ca. 60 lb ai/ field A in a transplant solution according to the current label. Trials must be conducted in CA, FL, NY, TX, and WI to adequately represent the commercial production areas of cabbage in the U.S. (Agricultural Statistics, 1981).

b. The registrant must also propose a label restriction limiting the maximum annual rate, which must be reflected by the data.

15/ No data were submitted regarding residues of PCNB, its metabolites or its impurities in or on cauliflower. However, the tests are not required because data required for broccoli and/or cabbage will also be used for cauliflower.

16/ To obtain a crop group tolerance, additional data would be required for broccoli and cabbage (see above) as well as for one additional Brassica (Cole) Leafy Vegetable crop, mustard greens.

TABLE A
GENERIC DATA REQUIREMENTS FOR PCNB

§ 158.125 Residue Chemistry

17/ The available data are insufficient for assessing either the interim tolerance for residues of PCNB, per se, or the proposed tolerance for the combined residues of PCNB, PCA, MPCPS, PCB and HCB in or on snap, lima or dry beans. The data are insufficient because no data represented the treatment regimen of consequence: a cummulative rate of 7.5 lb ai/A/season directed in split applications to the soil through first bloom. Therefore, the registrant must submit:

a. Data depicting residues of concern in or on snap, lima (succulent) and dry beans treated with the 10-75% D, 75% WP and 23-25% EC formulations (in separate treatments) at a total of 7.5 lb ai/A/season applied in split applications of 1.5 + 2.0 + 2.0 + 2.0 lb ai/field A at two-week intervals through first bloom as a directed spray to the soil in a band at the base of the plants. To adequately represent the geographic distribution of U.S. production (Agricultural Statistics, 1981) of snap beans, succulent limas, and dry beans, geographical representation must include trials conducted in (i) FL, NC/VA, NY and OR representing 65% of snap beans production; (ii) CA, DE/MD and WI representing 77% of lima bean production and (iii) CA, CO, ID, MI and ND, representing 85% of dry bean production, including navy, pinto and red kidney bean varieties.

b. Data from cannery residue from processed snap beans bearing measurable weathered residues of PCNB. An appropriate feed additive tolerance must be proposed if PCNB residues concentrate in the cannery residue.

c. Additionally, the registrant must (i) propose a label restriction specifying a minimum treatment-to-harvest interval, which must be reflected in the required data; and (ii) propose separate tolerances for snap, lima (succulent) and dry beans to reflect the current registered uses.

18/ To support the current registration for special local use on dry and snap beans in Michigan (SLN MI-820007), the registrant must submit:

a. Data concerning residues of concern in or on dry and snap beans from MI treated with the 75% WP at a cummulative rate of 7.5 lb ai/A resulting from split applications at 0.5 + 2.0 + 5.0 lb ai/field A applied at two-week intervals through first bloom in a directed spray to the soil in a band at the base of the plants.

b. Also, the registrant must propose a minimum treatment to harvest interval, which must be reflected by the requested data.

19/ To obtain a crop group tolerance, additional data will be required for succulent and dry beans (see above) and also for the additional Legume Vegetable crops, peas (succulent and dry) and soybeans.

TABLE A
GENERIC DATA REQUIREMENTS FOR PCNB

§ 158.125 Residue Chemistry

20/ The available data are insufficient for assessing the adequacy of either the interim tolerance for PCNB (per se) or the proposed tolerance for the combined residues of PCNB, its metabolites PCA and MPCPS, and its impurities PCB and HCB in or on peppers because (i) no data represented the labeled pretransplant in-furrow treatment; (ii) the geographic representation of the data from the transplant solution treatment was inadequate; and (iii) no data depicted residues of PCNB metabolites and/or impurities. The data submitted for tomatoes are not appropriate for data translation. Therefore, the registrant must submit:

Data depicting residues of PCNB and its metabolites and impurities of concern in or on peppers treated with the 75% WP formulation applied at 7.5 lb ai/field A in-furrow at transplanting and at 34.0 lb ai/field A in a transplant solution. Studies must be conducted in CA, FL, NJ and TX to adequately represent (ca. 64%) U.S. pepper production (1982 Census of Agriculture, Vol. 1).

21/ The available data are not sufficient to assess the adequacy of either the interim tolerance for PCNB (per se) or the pending tolerance for the combined residues of PCNB, its metabolites PCA and MPCPS, and its impurities PCB and HCB in or on tomatoes for the following reasons: (i) the application rates and methods did not represent the labeled maximum rates and application methods; (ii) adequate sample histories were not provided; and (iii) no data were provided for residues in processed tomato products. The data submitted for peppers are not appropriate for translation to tomatoes. Therefore, the registrant must submit:

a. Residue data depicting the combined residues of PCNB and its metabolites and impurities of concern in or on tomatoes treated with the 75% WP formulation applied at 7.5 lb ai/field A infurrow at transplanting and at 25.5 lb ai/field A (staked tomatoes) in a transplant solution. Studies must be conducted in CA(2), FL, IN/MI/OH, and DE/MD/NJ to adequately represent (ca. 82%) the commercial tomato production in the U.S. (1982 Census of Agriculture, Vol. 1).

b. Residue data from the processed products of tomatoes, including wet and dried pomace, puree, catsup and juice processed from tomatoes containing measurable weathered residues of PCNB. Appropriate food/feed additive tolerances must be proposed should the residues concentrate in the processed products.

22/ To obtain a crop group tolerance, the data requirements for tomatoes and peppers outlined above in footnotes 19 and 20 must be met.

TABLE A
GENERIC DATA REQUIREMENTS FOR PCNB

§ 158.125 Residue Chemistry

23/ The submitted data are insufficient for assessment of maximum expected residues of PCNB (per se) or the combined residues of PCNB, its metabolites PCA and MPCPS, and its impurities PCB and HCB in or on strawberries for the following reasons: sample histories were not adequate; and/or application rates and methods did not reflect the labeled use directions. The registrant must either:

a. Propose a tolerance for the combined residues of PCNB and its metabolites and impurities of concern in or on strawberries and submit appropriate and sufficient data in support of that tolerance. Trials must be conducted with the 75% WP in CA and reflect the currently labeled application methods and maximum use rates. In the case of the of posttransplant bed spray (banded?), the registrant must clarify the use rate by specifying the dose per application, the hand width (if banded), the number of treated row feet per field A, and the application volume per A. The required residue data must reflect these clarified directions for use, or

b. Cancel the current intrastate registration (CA State Reg. No. 10972-50199 AA).

24/ To obtain a crop group tolerance, data will be required for strawberries (see footnote 22) and for the additional Small Fruits & Berries crops: blueberries, cranberries and grapes.

25/ The submitted data are insufficient for determination of maximum expected residues of PCNB (per se) or the combined residues of PCNB, its metabolites PCA and MPCPS, and its impurities PCB and HCB in or on alfalfa forage and hay. The data were insufficient because they did not represent (i) forage and corresponding hay samples; (ii) samples from crops treated with multiple applications to successive cuttings; and (iii) desert conditions typical of AZ production areas. The available clover data are inappropriate for translation. The registrant must either:

a. Propose tolerances for the combined residues of PCNB and its metabolites and impurities of concern in or on alfalfa forage and hay, and submit data to support those tolerances. Trials must be conducted with the 2 lb/gal EC in AZ, and reflect multiple application treatments at 12 lb ai/A in 100 gal of water/A applied within 7 days after each of three successive cuttings. Samples of forage and hay must be collected after the third application. The registrant must also propose label restrictions limiting the maximum annual rate and specifying a minimum treatment-to-harvest interval, which must be reflected in the requested data; or

b. Cancel the current intrastate registration (AZ State Reg. No. "N", EPA Acc. No. 05009).

TABLE A
GENERIC DATA REQUIREMENTS FOR PCNB

§ 158.125 Residue Chemistry

26/ The submitted data are insufficient for determination of maximum expected residues of PCNB (per se) or the combined residues of PCNB, its metabolites PCA and MPCPS, and its impurities PCB and HCB in or on clover forage or hay because the data did not represent (i) forage and corresponding hay samples; (ii) samples from crops treated with multiple applications to successive cuttings; and (iii) trials conducted at locations representative of the desert production conditions in AZ. The data submitted for alfalfa were inappropiate for translation. The registrant must either:

a. Propose tolerances for the combined residues of PCNB concern in or on clover forage and hay, and submit data to support those tolerances. Data for alfalfa may be translated for this purpose. The registrant must also propose label restrictions limiting the maximum cummulative annual rate and specifying a minimum treatment-to-harvest interval, which must be reflected in the requested data; or

b. Cancel the current intrastate registration (AZ State Reg. No. "N", EPA Acc. No. 05009).

27/ To obtain a crop group tolerance, data will be required for alfalfa and clover (see footnotes 24 and 25). For purposes of a crop group tolerance, actual residue data for clover (rather than data translated from alfalfa) will be required.

28/ The submitted data are insufficient to assess the adequacy of either the interim tolerance for PCNB, per se, or the proposed tolerance for the combined residues of PCNB, its metabolites PCA and MPCPS, and its impurities PCB and HCB in or on bananas because: (i) no data represented the treatment regimen most likely to result in the highest residues; (ii) samples were not representative of the R.A.C.; (iii) residues of PCNB in or on the control samples are considered unacceptably high; and/or (iv) no data were presented for residues of pentachloroaniline (PCA), S-methyl pentachlorophenyl sulfide (MPCPS), and pentachlorobenzene (HCB) in or on treated bananas. Therefore, the registrant must:

a. Submit data depicting residues of PCNB and its metabolites and impurities of concern in or on bananas treated with the 1.63% RTU paste applied postharvest at 1 gallon product/700-800 stems by dipping the butt and tipend of the stalk, and brushing the remainder of the dose onto cuts and scrapes along the stems. Whole bananas (peels plus pulp, stem and crown tissue removed) shall be analyzed. Because the data indicate that residues may concentrate in or on the fruit during shipment, bananas (from the same bunch) must be analyzed immediately after treatment and again after arrival at the U.S. port of entry following intercontinental shipment under representative transport conditions. The data must depict minimum and maximum shipment intervals representative of those anticipated for transportation to various U.S. ports of entry.

b. The registrant(s) must submit copies of the labels for all PCNB products presently used in countries which export bananas to the U.S.

§ 158. 125 Residue Chemistry

29/ The submitted data indicate that the present tolerance for residues of PCNB, *per se*, in or on cottonseed is inadequately low. Tolerance-exceeding residues ($\leq$0.78 ppm) have been detected in several samples from 0.5x treatment rates. However, the available data are not sufficient to determine an appropriate tolerance level because (i) data from only two locations (or samples) represented the maximum labeled rate; (ii) sample handling procedures may have removed or allowed deterioration of residues before analysis; and (iii) sample histories were frequently deficient in one or more aspects.
Data for the processed products of cottonseed are inadequate because no data for cottonseed hulls, soapstock or refined oil were submitted. However, the data show that residues of PCNB, *per se*, in or on cottonseed do concentrate by ca. 6x factor in the crude oil. Therefore, additional data are required for cottonseed and its processed products:

a. Data depicting residues of PCNB and its metabolites and impurities of concern in or on cottonseed treated with a registered WP or EC, and a G formulation (in separate treatments) applied infurrow at 2 lb ai/field A. Treatments must also be conducted with a G at 2 lb ai/field A applied in a surface band over the row at planting. Studies must be conducted in AZ (9%), CA (25%), MS (12%), LA (7%), and TX (31%), including the Rio Grande Valley, to adequately represent U.S. commercial cottonseed production (values in parentheses represent % of total U.S. production according to *Agricultural Statistics*, 1984, p. 62). An appropriate tolerance revision must be proposed.

b. Although inadequate, the available processing study showed that the combined residues of PCNB and its metabolites, PCA and MPCPS, and impurities, PCB and HCB, did not concentrate in the meal. However, because the combined residues concentrated by a factor of 6x in the crude oil, and no data were submitted for hulls, soapstock, or refined oil, the registrant must submit a cottonseed processing study depicting the combined *residues of concern* in the hulls, meal, crude oil, soapstock and refined oil from cottonseed bearing measurable, weathered residues. Should the combined residues concentrate in the meal, hulls, soapstock or refined oil, appropriate food/feed additive tolerances must be proposed for those processed commodities. If the only residues of concern are found to be PCNB, PCA, MPCPS, PCB, and HCB, no additional *analyses* of meal or crude oil are needed.

30/ The available data are insufficient to assess the adequacy of *either* the interim tolerance for residues of PCNB, *per se*, in or on peanuts, *or* the proposed tolerances for the combined residues of PCNB, its metabolites PCA and MPCPS, and impurities PCB and HCB in or on peanuts and peanut hulls because (i) insufficient data were submitted depicting residues resulting from at-pegging treatments at 10 lb ai/A broadcast either aerially or via overhead sprinkler, or 10 lb ai/field A banded applied 45 days before harvest; (ii) the majority of the nutmeat samples did not represent the R.A.C. because they were washed before residue analysis; and (iii) sample histories were frequently incomplete. Therefore, the following additional data are required:

TABLE A
GENERIC DATA REQUIREMENTS FOR PCNB

§ 158. 125 Residue Chemistry

Residue data depicting residues of concern in or on peanut nutmeats and hulls harvested 45 days after an (at-pegging) surface-banded application of the 10 or 30% G, and 75% WP formulation (in separate trials) applied at 10 lb ai/field A. Tests must be conducted in AL, FL/GA, NC/VA, OK and TX to adequately represent (>80%) U.S. commercial peanut production (Agricultural Statistics, 1984).

31/ To support the various intrastate labels and SLN registrations, the registrant must submit:

a. Data for the combined residues of PCNB and its metabolites and impurities of concern from peanut nutmeats and hulls harvested 45 days after an at-pegging fungigation treatment (via overhead sprinkler) at 10 lb ai/A. Trials must be conducted with the 75% WP formulation in OK and TX, and appropriate 2 lb/gal EC formulations in AL, GA and TX.

b. Submit residue data for peanuts and their hulls to support the registered special local use in TX for (at-pegging) aerial broadcasts of the 10% G at 10 lb ai/A. The registrant must also propose a label restriction specifying a minimum treatment-to-harvest interval for this use, which must be reflected in the requested data.

32/ None of the available processing studies is adequate to assess potential residue concentration during fractionation into the processed products. Therefore, the registrant must submit a peanut processing study depicting the combined residues of concern in the meal, crude oil, soapstock and refined oil processed from raw peanuts bearing measurable, weathered residues. Should the combined residues concentrate in any of the processed commodities, appropriate food or feed additive tolerances must be proposed.

33/ Although no residues of PCNB, per se, were detected in or on the seed of sorghum, or the seedlings, roots and foliage of sugar beets grown from PCNB-treated seed, residue accountability was not sufficient to demonstrate no uptake and translocation of PCNB metabolities and/or impurities from the treated seed into the aerial portions of these crops. Additionally, no data were submitted for barley, corn, oats, peas, rice, safflower and wheat. Therefore, in order to maintain the non-food use classification for these seed treatment uses of PCNB, the registrant must submit radiotracer studies using benzene-labeled [^{14}C]PCNB to determine whether uptake and translocation of residues (radioactivity) into the food/feed commodities of corn, peas, rice, safflower, sugar beets and wheat occurs (these are considered representative commodities). Studies must be conducted at the respective maximum labeled rates for the seed treatments of these respective crops.

TABLE A
GENERIC DATA REQUIREMENTS FOR PCNB

§ 158.125 Residue Chemistry

34/ For soybeans, finite residues of PCNB, per se, were ≤0.041 ppm in or on the leaves from a crop treated at 0.7x the maximum labeled rate. Consequently, this PCNB use must be considered to be a food use. Therefore, the registrant must propose a tolerance for residues of concern in or on soybean forage and hay, and in or on soybeans. The registrant must submit data to support that tolerance. Studies must be conducted with the 30% D, 25% EC and 17% FlC formulations applied at 0.75 lb ai/bu as a seed treatment. The dose must be verified by analysis. Trials must be conducted in AR/LA/MS, AL/GA, IL, posttreatment MN, MO, NC/VA, and OH to represent >82% of U.S. soybean production (Agricultural Statistics, 1984).

35/ There are no registered direct-animal treatments for PCNB formulations on cattle, goats, hogs, horses or sheep. However, the available data indicate that PCNB residues (including its impurities) will transfer to the tissues and milk of livestock. Therefore, when appropriate feeding levels of PCNB and its metabolites and impurities of concern can be determined (based on required metabolism and residue data), appropriate feeding studies will be required.

Since the metabolism of PCNB in animals is not adequately understood, the residues of concern will be determined following receipt and evaluation of requested animal metabolism studies.

36/ There are no registered direct-animal treatments for PCNB formulations on poultry. When all established and proposed PCNB tolerances for residues in or on commodities that are fed to poultry have been assessed and found adequate, and the requested poultry metabolism data have been received and evaluated, the data from the study conducted with Red Comet chickens will be assessed to determine its adequacy for setting tolerances for the residues of PCNB and its metabolites and impurities of concern in the meat, meat by-products, and eggs of poultry.

37/ These requirements are reserved until such time as data indicate that the magnitude of PCNB residues at these sites pose concerns.

38/ These requirements are reserved until such time as the plant, animal and related residue data for PCNB have been received and reviewed for regulatory considerations.

TABLE A
GENERIC DATA REQUIREMENTS FOR PCNB

Data Requirement	Test 11/ Substance	Use Pattern	Does EPA Have Data?	Bibliographic Citation	Must Additional Data be Submitted?	Time Frame for Submimission
§158.145 Wildlife and Aquatic Organisms						
AVIAN AND MAMMALIAN TESTING						
71-1 - Acute Avian Oral Toxicity	TGAI	A,B	No		Yes	9 Months
71-2 - Avian Subacute Dietary Toxicity						
a. Upland gamebird	TGAI	A,B	Partially	00114165	Yes 1/	9 Months
b. Waterfowl	TGAI	A,B	Partially	00114164	Yes 1/	9 Months
71-3 - Wild Mammal Toxicity	TGAI	A,B	No		No 2/	
71-4 - Avian Reproduction						
a. Upland gamebird	TGAI	A,B	No		Yes 3/	24 Months
b. Waterfowl	TGAI	A,B	No		Yes 3/	24 Months
71-5 - Simulated and Actual Field Testing for	TGAI	A,B	No		Reserved 4/	
a. Mammals						
b. Birds						

TABLE A
GENERIC DATA REQUIREMENTS FOR PCNB

Data Requirement	Test1/ Substance	Use Pattern	Does EPA Have Data?	Bibliographic Citation	Must Additional Data be Submitted?	Time Fr for Submission
§158.145 Wildlife and Aquatic Organisms -						
AQUATIC ORGANISM TESTING						
72-1 - Freshwater Fish Toxicity a. Warmwater	TGAI	A,B	No		Yes	9 Months
	TEP	B	No		Yes 5/	9 Months
b. Coldwater	TGAI	A,B	No		Yes	9 Months
	TEP	B	No		Yes 5/	9 Months
72-2 - Acute Toxicity to Freshwater Invertebrates	TGAI	A,B	Yes	00114167	No	
72-3 - Acute Toxicity to Estuarine and Marine Organisms	TGAI	A	No		Yes 6/	12 Months
72-4 - Fish Early Life Stage, and	TGAI	A,B	No		Yes 7/	15 Months
Aquatic Invertebrate Life-Cycle	TGAI	A,B	No		Yes 7/	15 Months
72-5 - Fish - Life-Cycle	TGAI	A,B	No		Reserved 8/	27 Months

TABLE A
GENERIC DATA REQUIREMENTS FOR PCNB

Data Requirement	Test 11/ Substance	Use Pattern 2/	Does EPA Have Data?	Bibliographic Citation	Must Additional Data be Submitted?	Time Fr for Submission
§158.145 Wildlife and Aquatic Organisms - Continued						
72-6 - Aquatic Organism Accumulation a. Crustacean b. Fish c. Mollusk d. Insect Nymph	TGAI	A,B	No		No 9/	
72-7 - Simulated or Actual Field Testing for Aquatic Organisms	TEP	A,B	No		Reserved 10/	

1/ Available data indicate LC_{50} > 5000 ppm for both species. However, in view of extremely high residue levels expected following application at higher rates, these tests must be repeated at higher dose levels.
2/ Available data indicate PCNB is low in toxicity to mammals and its use patterns will not cause adverse effects to wild mammals.
3/ Data from this test are required to support uses of turf and beans.
4/ Requirement is reserved pending receipt of avian dietary and acute oral data and appropriate fate data.
5/ Data are required for warmwater and coldwater spp., using the 2.0 lb/gal emulsifiable concentrate formualtion.
6/ Data from these tests are required to support uses on turf and peanuts.
7/ To support uses on turf, cotton, and peanuts, data from both studies are required.
8/ Reserved pending receipt of environmental fate data and data from fish early life-stage test.
9/ Requirements are deferred, pending upon the results of environmental accumulation studies in fish and aquatic non-target organisms.
10/ Requirement is reserved pending receipt of acute LC_{50} data for fish and environmental fate data.
11/ The test substance must contain an HCB level equal to or less than 0.1%.

TABLE A
GENERIC DATA REQUIREMENTS FOR PCNB

Data Requirement	Test Substance	Use Pattern	Does EPA Have Data?	Bibliographic Citation	Must Additional Data be Submitted?	Time Frame for Submission
§158.155 Nontarget Insect						
NONTARGET INSECT TESTING - POLLINATORS:						
141-1 - Honey bee acute contact toxicity	TGAI	A,B	No	-	Yes	9 Months
141-2 - Honey bee - toxicity of residues on foliage	TEP	A,B	No		Reserved 1/	15 Months
141-4 - Honey bee subacute feeding study	(Reserved) 2/					
141-5 - Field testing for pollinators	TEP	A,B	No		Reserved 1/	15 Months
NONTARGET INSECT TESTING - AQUATIC INSECTS:						
142-1 - Acute toxicity to aquatic insects	(Reserved) 3/					
142-1 - Aquatic insect life-cycle study	(Reserved) 3/					
142-3 - Simulated or actual field testing for aquatic insects	(Reserved) 3/					
143-1 thru 143-3 - NONTARGET INSECT TESTING - PREDATORS AND PARASITES	(Reserved) 3/					

TABLE A
GENERIC DATA REQUIREMENTS FOR PCNB

Data Requirement	Test Substance	Use Pattern	Does EPA Have Data?	Bibliographic Citation	Must Additional Data be Submitted?	Time Frame for Submission
§158.155 Nontarget Insect con't						

1/ Requirement reserved pending receipt of data from honey bee acute contact LD_{50} study.
2/ Reserved pending development of test methodology.
3/ Reserved pending Agency decision as to whether the data requirement should be established.

TABLE A
GENERIC DATA REQUIREMENTS FOR PCNB

Data Requirement	Test Substance	Use Pattern	Does EPA Have Data?	Bibliographic Citation	Must Addtl Data be Submitted?	Time Frame for Submission
§158.140 Reentry Protection						
132-1 - Foliar Dissipation	TEP	A,B,C,D	No		No 1/	
132-1 - Soil Dissipation	TEP	A,B,C,D	No		No 1/	
133-3 - Dermal Exposure	TEP	A,B,C,D	No		No 1/	
133-4 - Inhalation Exposure	TEP	A,B,C,D	No		No 1/	
§158.142 Spray Drift						
201-1 - Droplet Size Spectrum	TEP	Reserved 2/				
201-1 - Drift Field Evaluation	TEP	Reserved 2/				
Special Tests		N/A 1/				

1/ Available data indicate that there are no toxicological concerns with regards to reentry exposure of PCNB by workers.

2/ Data are not required because PCNB does not fall within Toxicity Category I for acute toxicity and because the nonvolatile properties and methods of use should minimize exposure of workers reentering treated fields.

TABLE B

PRODUCT SPECIFIC DATA REQUIREMENTS FOR PCNB: [90% FORMULATION INTERMEDIATE[a], EPA REG. NO. 400-414],
[80% FORMULATION INTERMEDIATE[b] , EPA REG. NO. 7501-45],

Date Requirement	Test 2/ Substance	Use Patterns	Does EPA Have Data?	Bibliographic Citation	Must Additional Data be Submitted	Time Frame for Submission
§158.135 Toxicology						
ACUTE TESTING:						
81-1 - Acute Oral Toxicity - Rat	MP	A,B	Yes	00001555, Renner,1980	No	
81-2 - Acute Dermal Toxicity - Rabbit	MP	A,B	Yes	00001665, 00001668 00001870, 00114220	No	
81-3 - Acute Inhalation Toxicity - Rat	MP	A,B	Yes	00114203,	No	
81-4 - Eye Irritation - Rabbit	MP	A,B	Yes	00114203,	No	
81-5 - Dermal Irritation - Rabbit	MP	A,B	Yes	00001668, 00114220 00114222	No	
81-6 - Dermal Sensitization - Guinea Pig	MP	A,B	No	--	Yes	9 Months
81-7 - Acute Delayed Neurotoxicity - Hen	MP	A,B	No	—	No 1/	

---

a/ The 90% formulation intermediate serves as a manufacturing use product.
b/ The 80% formulation intermediate serves as a manufacturing use product.

1/ Technical PCNB is not an organophosphate or degradation product thereof, and it is not structurally related to a known acute delayed neurotoxic substance.
2/ The test substance must contain an HCB level equal to or less than 0.1%.

TABLE B

PRODUCT SPECIFIC DATA REQUIREMENTS FOR PCNB: [90% FORMULATION INTERMEDIATEa/, EPA REG. NO. 400-414],
[80% FORMULATION INTERMEDIATEb/, EPA REG. NO. 7501-45],

Data Requirement	Test 1/ Substance	Use Patterns	Does EPA Have Data?	Bibliographic Citation2/	Must Additional Data be Submitted?	Time Frame for Submission
§158.120 Product Chemistry						
Product Identity						
61-1 - Product Identity & Disclosure of Ingredients	MP	All	No	N/A	Yes	6 Months
61-2 - Description of Beginning Materials & Manufacturing Process	MP	All	No	N/A	Yes	6 Months
61-3 - Discussion of Formation of Impurities	MP	All	No	N/A	Yes	6 Months
Analysis and Certification of Product Ingredients						
62-1 - Preliminary Analysis of Product Samples	MP	All	No	N/A	Yes	12 Months
62-2 - Certification of Ingredient Limits	MP	All	No	N/A	Yes	12 Months
62-3 - Analytical Methods to Verify Certified Limits	MP	All	No	N/A	Yes	12 Months
Other Requirements						
64-1 - Submittal of Samples	N/A		No		No 3/	

---

a/ The 90% formulation intermediate serves as a manufacturing use product.
b/ The 80% formulation intermediate serves as a manufacturing use product.

1/ The PCNB test substance to be used as specified for each data requirement must be that substance which is currently produced and marketed.

2/ Not applicable. Although product chemistry data may been submitted in the past, the Agency has determined that these data must be resubmitted for each pesticide. New requirements have been introduced and previously submitted data must be updated. Therefore bibliographic citations for the old data are not applicable.

3/ The compound does not require submittal of samples at this time.

II. LABELING APPENDICES

Summary of Label Requirements and Table

40 CFR 162.10 Labeling Requirements

Physical/Chemical Hazards Labeling Statements

Storage Instructions

Pesticide Disposal Instructions

Container Disposal Instructions

SUMMARY-1

LABEL CONTENTS

40 CFR 162.10 requires that certain specific labeling statements appear at certain locations on the label. This is referred to as format labeling. Specific label items listed below are keyed to the table at the end of this Appendix.

Item 1. PRODUCT NAME - The name, brand or trademark is required to be located on the front panel, preferably centered in the upper part of the panel. The name of a product will not be accepted if it is false or misleading.

Item 2. COMPANY NAME AND ADDRESS - The name and address of the registrant or distributor is required on the label. The name and address should preferably be located at the bottom of the front panel or at the end of the label text.

Item 3. NET CONTENTS - A net contents statement is required on all labels or on the container of the pesticide. The preferred location is the bottom of the front panel immediately above the company name and address, or at the end of the label text. The net contents must be expressed in the largest suitable unit, e.g., "1 pound 10 ounces" rather than "26 ounces." In addition to English units, net contents may be expressed in metric units. [40 CFR 162.10(d)]

Item 4. EPA REGISTRATION NUMBER - The registration number assigned to the pesticide product must appear on the label, preceded by the phrase "EPA Registration No.," or "EPA Reg. No." The registration number must be set in type of a size and style similar to other print on that part of the label on which it appears and must run parallel to it. The registration number and the required identifying phrase must not appear in such a manner as to suggest or imply recommendation or endorsement of the product by the Agency. [40 CFR 162.10(e)]

Item 5. EPA ESTABLISHMENT NUMBER - The EPA establishment number, preceded by the phrase "EPA Est." is the final establishment at which the product was produced, and may appear in any suitable location on the label or immediate container. It must also appear on the wrapper or outside container of the package if the EPA establishment number on the immediate container cannot be clearly read through such wrapper or container. [40 CFR 162.10(f)]

Item 6A. INGREDIENTS STATEMENT - An ingredients statement is required on the front panel. The ingredients statement must contain the name and percentage by weight of each active ingredient and the total percentage by weight of all inert ingredients. The preferred location is immediately below the product name. The ingredients statement must run parallel with, and be clearly distinguished from, other text on the panel. It must not be placed in the body of other text. [40 CFR 162.10(g)]

Item 6B. POUNDS PER GALLON STATFMENT - For liquid agricultural formulations, the pounds per gallon of active ingredient must be indicated on the label.

Item 7. FRONT LABEL PRECAUTIONARY STATEMENTS - Front panel precautionary statements must be grouped together, preferably within a block outline. The table below shows the minimum type size requirements for various size labels.

Size of Label on Front Panel in Square Inches	Signal Word Minimum Type Size All Capitals	"Keep Out of Reach of Children" Minimum Type Size
5 and under	6 point	6 point
above 5 to 10	10 point	6 point
above 10 to 15	12 point	8 point
above 15 to 30	14 point	10 point
over 30	18 point	12 point

Item 7A. CHILD HAZARD WARNING STATEMENT - The statement "Keep Out of Reach of Children" must be located on the front panel above the signal word except where contact with children during distribution or use is unlikely. [40 CFR 162.10(h)(1)(ii)]

Item 7B. SIGNAL WORD - The signal word (DANGER, WARNING, or CAUTION) is required on the front panel immediately below the child hazard warning statement. [40 CFR 162.10 (h)(1)(i)]

Item 7C. SKULL & CROSSBONES AND WORD "POISON" - On products assigned a toxicity Category I on the basis of oral, dermal, or inhalation toxicity, the word "Poison" shall appear on the label in red on a background of distinctly contrasting color and the skull and crossbones shall appear in immediate proximity to the word POISON. [40 CFR 162.10(h)(1)(i)]

Item 7D. STATEMENT OF PRACTICAL TREATMENT - A statement of practical treatment (first aid or other) shall appear on the label of pesticide products in toxicity Categories I, II, and III. [40 CFR 162.10(h)(1)(iii)]

Item 7E. REFERRAL STATEMENT - The statement "See Side (or Back) Panel for Additional Precautionary Statements" is required on the front panel for all products, unless all required precautionary statements appear on the front panel. [40 CFR 162.10(h)(1)(iii)]

Item 8. SIDE/BACK PANEL PRECAUTIONARY LABELING - The precautionary statements listed below must appear together on the label under the heading "PRECAUTIONARY STATEMENTS." The preferred location is at the top of the side or back panel preceding the directions for use, and it is preferred that these statements be surrounded by a block outline. Each of the three hazard warning statements must be headed by the appropriate hazard title. [40 CFR 162.10(h)(2)].

Item 8A. HAZARD TO HUMANS AND DOMESTIC ANIMALS - Where a hazard exists to humans or domestic animals, precautionary statements are required indicating the particular hazard, the route(s) of exposure and the precautions to be taken to avoid accident, injury or damage. [40 CFR 162.10(h)(2)(i)]

Item 8B. ENVIRONMENTAL HAZARD - Where a hazard exists to non-target organisms excluding humans and domestic animals, precautionary statements are required stating the nature of the hazard and the appropriate precautions to avoid potential accident, injury, or damage. [40 CFR 162.10(h)(2)(ii)]

Item 8C. PHYSICAL OR CHEMICAL HAZARD - FLAMMABILITY Precautionary statements relating to flammability of a product are required to appear on the label if it meets the criteria in the PHYS/CHEM Labeling Appendix. The requirement is based on the results of the flashpoint determinations and flame extension tests required to be submitted for all products. These statements are to be located in the side/back panel precautionary statements section, preceded by the heading "Physical/Chemical Hazards." Note that no signal word is used in conjunction with the flammability statements.

Item 9A. RESTRICTED USE CLASSIFICATION - FIFRA sec. 3(d) requires that all pesticide formulations/uses be classified for either general or restricted use. Products classified for restricted use may be limited to use by certified applicators or persons under their direct supervision (or may be subject to other restrictions that may be imposed by regulation).

In the Registration Standard, the Agency has (1) indicated certain formulations/uses are to be restricted (Section IV indicates why the product has been classified for restricted use); or (2) reserved any classification decision until appropriate data are submitted.

The Regulatory Position and Rationale states whether products containing this active ingredient are classified for restricted use. If they are restricted the draft label(s) submitted to the Agency as part of your application must reflect this determination (see below).

If you do not believe that your product should be classified for restricted use, you must submit any information and rationale with your application for reregistration. During the Agency's review of your application, your proposed classification determination will be evaluated in accordance with the provisions of 40 CFR 162.11(c). You will be notified of the Agency's classification decision.

Classification Labeling Requirements

If your product has been classified for restricted use, the following label requirements apply:

1. All uses restricted.

a. The statement "Restricted Use Pesticide" must appear at the top of the front panel of the label. The statement must be set in type of the same minimum size as required for human hazard signal word (see table in 40 CFR 162.10(h)(1)(iv)

b. Directly below this statement on the front panel, a summary statement of the terms of restriction must appear (including the reasons for restriction if specified in Section I). If use is restricted to certified applicators, the following statement is required: "For retail sale to and use only by Certified Applicators or persons under their direct supervision and only for those uses covered by the Certified Applicator's Certification."

2. Some but not all uses restricted. If the Regulatory Position and Rationale states that some uses are classified for restricted use, and some are unclassified, several courses of action are available:

a. You may label the product for Restricted use. If you do so, you may include on the label uses that are unrestricted, but you may not distinguish them on the label as being unrestricted.

b. You may delete all restricted uses from your label and submit draft labeling bearing only unrestricted uses.

c. You may "split" your registration, i.e., register two separate products with identical formulations, one bearing only unrestricted uses, and the other bearing restricted uses. To do so, submit two applications for reregistration, each containing all forms and necessary labels. Both applications should be submitted simultaneously. Note that the products will be assigned separate registration numbers.

Item 9B. MISUSE STATEMENT - All products must bear the misuse statement, "It is a violation of Federal law to use this product in a manner inconsistent with its labeling." This statement appears at the beginning of the directions for use, directly beneath the heading of that section.

Item 10A. REENTRY STATEMENT - If a reentry interval has been established by the Agency, it must be included on the label. Additional worker protection statements may be required in accordance with PR Notice 83-2, March 29, 1983.

Item 10B. STORAGE AND DISPOSAL BLOCK - All labels are required to bear storage and disposal statements. These statements are developed for specific containers, sizes, and chemical content. These instructions must be grouped and appear under the heading "Storage and Disposal" in the directions for use. This heading must be set in the same type sizes as required for the child hazard warning. Refer to Appendix II, STOR, PEST/DIS, and CONT/DIS to determine the storage and disposal instructions appropriate for your products.

Item 10C. DIRECTIONS FOR USE - Directions for use must be stated in terms which can be easily read and understood by the average person likely to use or to supervise the use of the pesticide. When followed, directions must be adequate to protect the public from fraud and from personal injury and to prevent unreasonable adverse effects on the environment. [40 CFR 162.10]

COLLATERAL LABELING

Bulletins, leaflets, circulars, brochures, data sheets, flyers, or other written or graphic printed matter which is referred to on the label or which is to accompany the product are termed collateral labeling. Such labeling may not bear claims or representations that differ in substance from those accepted in connection with registration of the product. It should be made part of the response to this notice and submitted for review.

SUMMARY-6

LABELING REQUIREMENTS OF THE FIFRA, AS AMENDED

ITEM	LABEL ELEMENT	APPLICABILITY OF REQUIREMENT	PLACEMENT ON LABEL		COMMENTS
			REQUIRED	PREFERRED	
1	Product name	All products	Front panel	Center front panel	
2	Company name and address	All products	None	Bottom front panel or end of label text	If registrant is not the producer, must be qualified by "Packed for . . .," "Distributed by. . .," etc.
3	Net contents	All products	None	Bottom front panel or end of label text	May be in metric units in addition to U.S. units
4	EPA Reg. No.	All products	None	Front panel	Must be in similar type size and run parallel to other type.
5	EPA Est. No.	All products	None	Front panel, immediately before or following Reg. No.	May appear on the container instead of the label.
6A	Ingredients statement	All products	Front panel	Immediately following product name	Text must run parallel with other text on the panel.
6B	Pounds/gallon statement	Liquid products where dosage given as lbs. ai/unit area	Front panel	Directly below the main ingredients statement	
7	Front panel precautionary statements	All products	Front panel		All front panel precautionary statements must be grouped together, preferably blocked.
7A	Keep Out of Reach of Children (Child hazard warning)	All products	Front panel	Above signal word	Note type size requirements.
7B	Signal word	All products	Front panel	Immediately below child hazard warning	Note type size requirements.

ITEM	LABEL ELEMENT	APPLICABILITY OF REQUIREMENT	PLACEMENT ON LABEL		COMMENTS
			REQUIRED	PREFERRED	
7C	Skull & crossbones and word POISON (in red)	All products which are Category I based on oral, dermal, or inhalation toxicity	Front panel	Both in close proximity to signal word	
7D	Statement of Practical Treatment or First Aid	All products in Categories I, II, and III	Category I: Front panel unless referral statement is used. Others: Grouped with side panel precautionary statements.	Front panel for all.	
7E	Referral statement	All products where precautionary labeling appears on other than front panel.	Front panel		
8	Side/back panel precautionary statements	All products	None	Top or side of back panel preceding directions for use	Must be grouped under the headings in 8A, 8B, and 8C; preferably blocked.
8A	Hazards to humans and domestic animals	All products in Categories I, II, and III	None	Same as above	Must be preceded by appropriate signal word.
8B	Environmental hazards	All products	None	Same as above	Environmental hazards include bee caution where applicable.

SUMMARY-8

ITEM	LABEL ELEMENT	APPLICABILITY OF REQUIREMENT	PLACEMENT ON LABEL		COMMENTS
			REQUIRED	PREFERRED	
8C	Physical or chemical hazards	All pressurized products, others with flash points under 150°F	None	Same as above	Refer to Appendix II guide PHYS/CHEM
9A	Restricted block	All restricted products	Top center of front panel	Preferably blocked	Includes a statement of the terms of restriction. The words "RESTRICTED USE PESTICIDE" must be same type size as signal word.
9B	Misuse statement	All products	Immediately following heading of directions for use		Required statement is: "It is a violation of Federal law to use this product in a manner inconsistent with its labeling."
10A	Reentry statement	PR Notice 83-2 or as determined by the Agency	In the directions for use	Immediately after misuse statement	
10B	Storage and disposal block	All products	In the directions for use	Immediately before specific directions for use or at the end of directions for use	Must be set apart and clearly distinguishable from from other directions for use. Refer to Appendix II guides STOR, CONT/DIS, and PEST/DIS for further information and required statements.
10C	Directions for use	All products	None	None	May be in metric as well as U.S. units

§ 162.10 Labeling requirements.

(a) *General*—(1) *Contents of the label.* Every pesticide products shall bear a label containing the information specified by the Act and the regulations in this Part. The contents of a label must show clearly and prominently the following:

(i) The name, brand, or trademark under which the product is sold as prescribed in paragraph (b) of this section;

(ii) The name and address of the producer, registrant, or person for whom produced as prescribed in paragraph (c) of this section;

(iii) The net contents as prescribed in paragraph (d) of this section;

(iv) The product registration number as prescribed in paragraph (e) of this section;

(v) The producing establishment number as prescribed in paragraph (f) of this section;

(vi) An ingredient statement as prescribed in paragraph (g) of this section;

(vii) Warning or precautionary statements as prescribed in paragraph (h) of this section;

(viii) The directions for use as prescribed in paragraph (i) of this section; and

(ix) The use classification(s) as prescribed in paragraph (j) of this section.

(2) *Prominence and legibility.* (i) All words, statements, graphic representations, designs or other information required on the labeling by the Act or the regulations in this part must be clearly legible to a person with normal vision, and must be placed with such conspicuousness (as compared with other words, statements, designs, or graphic matter on the labeling) and expressed in such terms as to render it likely to be read and understood by the ordinary individual under customary conditions of purchase and use.

(ii) All required label text must:

(A) Be set in 6-point or larger type;

(B) Appear on a clear contrasting background; and

(C) Not be obscured or crowded.

(3) *Language to be used.* All required label or labeling text shall appear in the English language. However, the Agency may require or the applicant may propose additional text in other languages as is considered necessary to protect the public. When additional text in another language is necessary, all labeling requirements will be applied equally to both the English and other-language versions of the labeling.

(4) *Placement of Label*—(i) *General.* The label shall appear on or be securely attached to the immediate container of the pesticide product. For purposes of this Section, and the misbranding provisions of the Act, "securely attached" shall mean that a label can reasonably be expected to remain affixed during the foreseeable conditions and period of use. If the immediate container is enclosed within a wrapper or outside container through which the label cannot be clearly read, the label must also be securely attached to such outside wrapper or container, if it is a part of the package as customarily distributed or sold.

(ii) *Tank cars and other bulk containers*—(A) *Transportation.* While a pesticide product is in transit, the appropriate provisions of 49 CFR Parts 170-189, concerning the transportation of hazardous materials, and specifically those provisions concerning the labeling, marking and placarding of hazardous materials and the vehicles carrying them, define the basic Federal requirements. In addition, when any registered pesticide product is transported in a tank car, tank truck or other mobile or portable bulk container, a copy of the accepted label must be attached to the shipping papers, and left with the consignee at the time of delivery.

(B) *Storage.* When pesticide products are stored in bulk containers, whether mobile or stationary, which remain in the custody of the user, a copy of the label of labeling, including all appropriate directions for use, shall be securely attached to the container in the immediate vicinity of the discharge control valve.

(5) *False or misleading statements.* Pursuant to section 2(q)(1)(A) of the Act, a pesticide or a device declared subject to the Act pursuant to § 162.15, is misbranded if its labeling is false or misleading in any particular including both pesticidal and non-pesticidal claims. Examples of statements or representations in the labeling which constitute misbranding include:

(i) A false or misleading statement concerning the composition of the product;

(ii) A false or misleading statement concerning the effectiveness of the product as a pesticide or device;

(iii) A false or misleading statement about the value of the product for purposes other than as a pesticide or device;

(iv) A false or misleading comparison with other pesticides or devices;

(v) Any statement directly or indirectly implying that the pesticide or device is recommended or endorsed by any agency of the Federal Government;

(vi) The name of a pesticide which contains two or more principal active

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ingredients if the name suggests one or more but not all such principal active ingredients even though the names of the other ingredients are stated elsewhere in the labeling;

(vii) A true statement used in such a way as to give a false or misleading impression to the purchaser;

(viii) Label disclaimers which negate or detract from labeling statements required under the Act and these regulations;

(ix) Claims as to the safety of the pesticide or its ingredients, including statements such as "safe," "nonpoisonous," "noninjurious," "harmless" or "nontoxic to humans and pets" with or without such a qualifying phrase as "when used as directed"; and

(x) Non-numerical and/or comparative statements on the safety of the product, including but not limited to:

(A) "Contains all natural ingredients";

(B) "Among the least toxic chemicals known"

(C) "Pollution approved"

(6) *Final printed labeling.* (i) Except as provided in paragraph (a)(6)(ii) of this section, final printed labeling must be submitted and accepted prior to registration. However, final printed labeling need not be submitted until draft label texts have been provisionally accepted by the Agency.

(ii) Clearly legible reproductions or photo reductions will be accepted for unusual labels such as those silk-screened directly onto glass or metal containers or large bag or drum labels. Such reproductions must be of microfilm reproduction quality.

(b) *Name, brand, or trademark.* (1) The name, brand, or trademark under which the pesticide product is sold shall appear on the front panel of the label.

(2) No name, brand, or trademark may appear on the label which:

(i) Is false or misleading, or

(ii) Has not been approved by the Administrator through registration or supplemental registration as an additional name pursuant to § 162.6(b)(4).

(c) Name and address of producer, registrant, or person for whom produced. An unqualified name and address given on the label shall be considered as the name and address of the producer. If the registrant's name appears on the label and the registrant is not the producer, or if the name of the person for whom the pesticide was produced appears on the label, it must be qualified by appropriate wording such as "Packed for * * *," "Distributed by * * *," or "Sold by * * *" to show that the name is not that of the producer.

(d) *Net weight or measure of contents.* (1) The net weight or measure of content shall be exclusive of wrappers or other materials and shall be the average content unless explicitly stated as a minimum quantity.

(2) If the pesticide is a liquid, the net content statement shall be in terms of liquid measure at 68° F (20°C) and shall be expressed in conventional American units of fluid ounces, pints, quarts, and gallons.

(3) If the pesticide is solid or semisolid, viscous or pressurized, or is a mixture of liquid and solid, the net content statement shall be in terms of weight expressed as avoirdupois pounds and ounces.

(4) In all cases, net content shall be stated in terms of the largest suitable units, i.e., "1 pound 10 ounces" rather than "26 ounces."

(5) In addition to the required units specified, net content may be expressed in metric units.

(6) Variation above minimum content or around an average is permissible only to the extent that it represents deviation unavoidable in good manufacturing practice. Variation below a stated minimum is not permitted. In no case shall the average content of the packages in a shipment fall below the stated average content.

(e) *Product registration number.* The registration number assigned to the pesticide product at the time of registration shall appear on the label, preceded by the phrase "EPA Registration No.," or the phrase "EPA Reg. No." The registration number shall be set in type of a size and style similar to other print on that part of the label on which it appears and shall run parallel to it. The registration number and the required identifying phrase shall not appear in such a manner as to suggest or imply recommendation or endorsement of the product by the Agency.

(f) *Producing establishments registration number.* The producing establishment registration number preceded by the phrase "EPA Est.", of the final establishment at which the product was produced may appear in any suitable location on the label or immediate container. It must appear on the wrapper or outside container of the package if the EPA establishment registration number on the immediate container cannot be clearly read through such wrapper or container.

(g) *Ingredient statement*—(1) *General.* The label of each pesticide product must bear a statement which contains the name and percentage by weight of each active ingredient, the total percentage by weight of all inert ingredients; and if the pesticide contains arsenic in any form, a statement of the percentages of total and water-soluble arsenic calculated as elemental arsenic. The active ingredients must be designated by the term "active ingredients" and the inert ingredients by the term "inert ingredients," or the singular forms of these terms where appropriate. Both terms shall [illegible] in the same type size, be aligned to the same margin and be equally prominent. The statement "Inert Ingredients, none" is not required for pesticides which contain 100 percent active ingredients. Unless the ingredient statement is a complete analysis of the pesticide, the term "analysis" shall not be used as a heading for the ingredient statement.

(2) *Position of ingredient statement.* (i) The ingredient statement is normally required on the front panel of the label. If there is an outside container or wrapper through which the ingredient statement cannot be clearly read, the ingredient statement must also appear on such outside container or wrapper. If the size or form of the package makes it impracticable to place the ingredient statement on the front panel of the label, permission may be granted for the ingredient statement to appear elsewhere.

(ii) The text of the ingredient statement must run parallel with other text on the panel on which it appears, and must be clearly distinguishable from and must not be placed in the body of other text.

(3) *Names to be used in ingredient statement.* The name used for each ingredient shall be the accepted common name, if there is one, followed by the chemical name. The common name may be used alone only if it is well known. If no common name has been established, the chemical name alone shall be used. In no case will the use of a trademark or proprietary name be permitted unless such name has been accepted as a common name by the Administrator under the authority of Section 25(c)(6).

(4) *Statements of percentages.* The percentages of ingredients shall be stated in terms of weight-to-weight. The sum of percentages of the active and the inert ingredients shall be 100. Percentages shall not be expressed by a range of values such as "22-25%." If the uses of the pesticide product are expressed as weight of active ingredient per unit area, a statement of the weight of active ingredient per unit volume of the pesticide formulation shall also appear in the ingredient statement.

(5) *Accuracy of stated percentages.* The percentages given shall be as precise as possible reflecting good manufacturing practice. If there may be unavoidable variation between manufacturing batches, the value stated for each active ingredient shall be the lowest percentage which may be present.

(6) *Deterioration.* Pesticides which change in chemical composition significantly must meet the following labeling requirements:

(i) In cases where it is determined that a pesticide formulation changes chemical composition significantly, the product must bear the following statement in a prominent position on the label: "Not for sale or use after [date]."

(ii) The product must meet all label claims up to the expiration time indicated on the label.

(7) *Inert ingredients.* The Administrator may require the name of any inert ingredient(s) to be listed in the ingredient statement if he determines that such ingredient(s) may pose a hazard to man or the environment.

(h) *Warnings and precautionary statements.* Required warnings and precautionary statements concerning the general areas of toxicological hazard including hazard to children, environmental hazard, and physical or chemical hazard fall into two groups; those required on the front panel of the labeling and those which may appear elsewhere. Specific requirements concerning content, placement, type size, and prominence are given below.

(1) *Required front panel statements.* With the exception of the child hazard warning statement, the text required on the front panel of the label is determined by the Toxicity Category of the pesticide. The category is assigned on the basis of the highest hazard shown by any of the indicators in the table below:

Hazard indicators	Toxicity categories			
	I	II	III	IV
Oral LD_{50}	Up to and including 50 mg/kg.	From 50 thru 500 mg/kg.	From 500 thru 5000 mg/kg.	Greater than 5000 mg/kg.
Inhalation LC_{50}	Up to and including .2 mg/liter.	From .2 thru 2 mg/liter.	From 2. thru 20 mg/liter.	Greater than 20 mg/liter.
Dermal LD_{50}	Up to and including 200 mg/kg.	From 200 thru 2000	From 2,000 thru 20,000	Greater than 20,000.
Eye effects	Corrosive; corneal opacity not reversible within 7 days.	Corneal opacity reversible within 7 days; irritation persisting for 7 days.	No corneal opacity; irritation reversible within 7 days.	No irritation.
Skin effects	Corrosive	Severe irritation at 72 hours.	Moderate irritation at 72 hours.	Mild or slight irritation at 72 hours.

(i) *Human hazard signal word*—(A) *Toxicity Category I.* All pesticide products meeting the criteria of Toxicity Category I shall bear on the front panel the signal word "Danger." In addition if the product was assigned to Toxicity Category I on the basis of its oral, inhalation or dermal toxicity (as distinct from skin and eye local effects) the word "Poison" shall appear in red on a background of distinctly contrasting color and the skull and crossbones shall appear in immediate proximity to the word "poison."

(B) *Toxicity Category II.* All pesticide products meeting the criteria of Toxicity Category II shall bear on the front panel the signal word "Warning."

(C) *Toxicity Category III.* All pesticide products meeting the criteria of Toxicity Category III shall bear on the front panel the signal word "Caution."

(D) *Toxicity Category IV.* All pesticide products meeting the criteria of Toxicity Category IV shall bear on the front panel the signal word "Caution."

(E) *Use of signal words.* Use of any signal word(s) associated with a higher Toxicity Category is not permitted except when the Agency determines that such labeling is necessary to prevent unreasonable adverse effects on man or the environment. In no case shall more than one human hazard signal word appear on the front panel of a label.

(ii) *Child hazard warning.* Every pesticide product label shall bear on the front panel the statement "keep out of reach of children." Only in cases where the likelihood of contact with children during distribution, marketing, storage or use is demonstrated by the applicant to be extremely remote, or if the nature of the pesticide is such that it is approved for use on infants or small children, may the Administrator waive this requirement.

(iii) *Statement of practical treatment*—(A) *Toxicity Category I.* A statement of practical treatment (first aid or other) shall appear on the front panel of the label of all pesticides falling into Toxicity Category I on the basis of oral, inhalation or dermal toxicity. The Agency may, however, permit reasonable variations in the placement of the statement of practical treatment is some reference such as "See statement of practical treatment on back panel" appears on the front panel near the word "Poison" and the skull and crossbones.

(B) *Other toxicity categories.* The statement of practical treatment is not required on the front panel except as described in paragraph (h)(1)(iii)(A) of this section. The applicant may, however, include such a front panel statement at his option. Statements of practical treatment are, however, required elsewhere on the label in accord with paragraph (h)(2) of this section if they do not appear on the front panel.

(iv) *Placement and prominence.* All the require front panel warning statements shall be grouped together on the label, and shall appear with sufficient prominence relative to other front panel text and graphic material to make them unlikely to be overlooked under customary conditions of purchase and use. The following table shows the minimum type size requirements for the front panel warning statements on various sizes of labels:

Size of label front panel in square inches	Points	
	Required signal word, all capitals	"Keep out of reach of children"
5 and under	6	6
Above 5 to 10	10	6
Above 10 to 15	12	8
Above 15 to 30	14	10
Over 30	16	12

(2) *Other required warnings and precautionary statements.* The warnings and precautionary statements as required below shall appear together on the label under the general heading "Precautionary Statements" and under appropriate subheadings of "Hazard to Humans and Domestic Animals," "Environmental Hazard" and "Physical or Chemical Hazard."

(i) *Hazard to humans and domestic animals.* (A) Where a hazard exists to humans or domestic animals, precautionary statements are required indicating the particular hazard, the route(s) of exposure and the precautions to be taken to avoid accident, injury or damage. The precautionary paragraph shall be immediately preceded by the appropriate hazard signal word.

(B) The following table depicts typical precautionary statements. These statements must be modified or expanded to reflect specific hazards.

Toxicity category	Precautionary statements by toxicity category	
	Oral, inhalation, or dermal toxicity	Skin and eye local effects
I	Fatal (poisonous) if swallowed [inhaled or absorbed through skin]. Do not breathe vapor [dust or spray mist]. Do not get in eyes, on skin, or on clothing [Front panel statement of practical treatment required.].	Corrosive, causes eye and skin damage [or skin irritation]. Do not get in eyes, on skin, or on clothing. Wear goggles or face shield and rubber gloves when handling. Harmful or fatal if swallowed. [Appropriate first aid statement required.]
II	May be fatal if swallowed [inhaled or absorbed through the skin]. Do not breathe vapors [dust or spray mist]. Do not get in eyes, on skin, or on clothing. [Appropriate first aid statements required.].	Causes eye [and skin] irritation. Do not get in eyes, on skin, or on clothing. Harmful if swallowed. [Appropriate first aid statement required.]
III	Harmful if swallowed [inhaled or absorbed through the skin]. Avoid breathing vapors [dust or spray mist]. Avoid contact with skin [eyes or clothing]. [Appropriate first aid statement required.].	Avoid contact with skin, eyes or clothing. In case of contact immediately flush eyes or skin with plenty of water. Get medical attention if irritation persists.
IV	[No precautionary statements required.]	[No precautionary statements required.]

(ii) ***Environmental hazards.*** Where a hazard exists to non target organisms excluding humans and domestic animals, precautionary statements are required stating the nature of the hazard and the appropriate precautions to avoid potential accident, injury or damage. Examples of the hazard statements and the circum-

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stances under which they are required follow:

(A) If a pesticide intended for outdoor use contains an active ingredient with a mammalian acute oral LD_{50} of 100 or less, the statement "This Pesticide is Toxic to Wildlife" is required.

(B) If a pesticide intended for outdoor use contains an active ingredient with a fish acute LC_{50} of 1 ppm or less, the statement "This Pesticide is Toxic to Fish" is required.

(C) If a pesticide intended for outdoor use contains an active ingredient with an avian acute oral LD_{50} of 100 mg/kg or less, or a subacute dietary LC_{50} of 500 ppm or less, the statement "This Pesticide is Toxic to Wildlife" is required.

(D) If either accident history or field studies demonstrate that use of the pesticide may result in fatality to birds, fish or mammals, the statement "This pesticide is extremely toxic to wildlife (fish)" is required.

(E) For uses involving foliar application to agricultural crops, forests, or shade trees, or for mosquito abatement treatments, pesticides toxic to pollinating insects must bear appropriate label cautions.

(F) For all outdoor uses other than aquatic applications the label must bear the caution "Keep out of lakes, ponds or streams. Do not contaminate water by cleaning of equipment or disposal of wastes."

(iii) *Physical or chemical hazards.* Warning statements on the flammability or explosive characteristics of the pesticide are required as follows:

Flash point	Required text
(A) PRESSURIZED CONTAINERS	
Flash point at or below 20° F; if there is a flashback at any valve opening.	Extremely flammable. Contents under pressure. Keep away from fire, sparks, and heated surfaces. Do not puncture or incinerate container. Exposure to temperatures above 130° F may cause bursting.
Flash point above 20° F and not over 80° F or if the flame extension is more than 18 in long at a distance of 6 in from the flame.	Flammable. Contents under pressure. Keep away from heat, sparks, and open flame. Do not puncture or incinerate container. Exposure to temperatures above 130° F may cause bursting.
All other pressurized containers	Contents under pressure. Do not use or store near heat or open flame. Do not puncture or incinerate container. Exposure to temperatures above 130° F may cause bursting.
(B) NONPRESSURIZED CONTAINERS	
At or below 20° F	Extremely flammable. Keep away from fire, sparks, and heated surfaces.
Above 20° F and not over 80° F	Flammable. Keep away from heat and open flame.
Above 80° F and not over 150° F	Do not use or store near heat or open flame.

(i) *Directions for Use*—(1) *General requirements*—(i) *Adequacy and clarity of directions.* Directions for use must be stated in terms which can be easily read and understood by the average person likely to use or to supervise the use of the pesticide. When followed, directions must be adequate to protect the public from fraud and from personal injury and to prevent unreasonable adverse effects on the environment.

(ii) *Placement of directions for use.* Directions may appear on any portion of the label provided that they are conspicuous enough to be easily read by the user of the pesticide product. Directions for use may appear on printed or graphic matter which accompanies the pesticide provided that:

(A) If required by the Agency, such printed or graphic matter is securely attached to each package of the pesticide, or placed within the outside wrapper or bag;

(B) The label bears a reference to the directions for use in accompanying leaflets or circulars, such as "See directions in the enclosed circular:" and

(C) The Administrator determines that it is not necessary for such directions to appear on the label.

(iii) *Exceptions to requirement for direction for use*—(A) Detailed directions for use may be omitted from labeling of pesticides which are intended for use only by manufacturers of products other than pesticide products in their regular manufacturing processes, provided that:

(*1*) The label clearly shows that the product is intended for use only in manufacturing processes and specifies the type(s) of products involved.

(*2*) Adequate information such as technical data sheets or bulletins, is available to the trade specifying the type of product involved and its proper use in manufacturing processes;

(*3*) The product will not come into the hands of the general public except after incorporation into finished products; and

(*4*) The Administrator determines that such directions are not necessary to prevent unreasonable adverse effects on man or the environment.

(B) Detailed directions for use may be omitted from the labeling of pesticide products for which sale is limited to physicians, veterinarians, or druggists, provided that:

(*1*) The label clearly states that the product is for use only by physicians or veterinarians;

(*2*) The Administrator determines that such directions are not necessary to prevent unreasonable adverse effects on man or the environment; and

(*3*) The product is also a drug and regulated under the provisions of the Federal Food, Drug and Cosmetic Act.

(C) Detailed directions for use may be omitted from the labeling of pesticide products which are intended for use only by formulators in preparing pesticides for sale to the public, provided that:

(*1*) There is information readily available to the formulators on the composition, toxicity, methods of use, applicable restrictions or limitations, and effectiveness of the product for pesticide purposes;

(*2*) The label clearly states that the product is intended for use only in manufacturing, formulating, mixing, or repacking for use as a pesticide and specifies the type(s) of pesticide products involved;

(*3*) The product as finally manufactured, formulated, mixed, or repackaged is registered; and

(*4*) The Administrator determines that such directions are not necessary to prevent unreasonable adverse effects on man or the environment.

(2) *Contents of Directions for Use.* The directions for use shall include the following, under the headings "Directions for Use":

(i) The statement of use classification as prescribed in 162.10(j) immediately under the heading "Directions for Use."

(ii) Immediately below the statement of use classification, the statement "It is a violation of Federal law to use this product in a manner inconsistent with its labeling."

(iii) The site(s) of application, as for example the crops, animals, areas, or objects to be treated.

(iv) The target pest(s) associated with each site.

(v) The dosage rate associated with each site and pest.

(vi) The method of application, including instructions for dilution, if required, and type(s) of application apparatus or equipment required.

(vii) The frequency and timing of applications necessary to obtain effective results without causing unreasonable adverse effects on the environment.

(viii) Specific limitations on reentry to areas where the pesticide has been applied, meeting the requirements concerning reentry provided by 40 CFR Part 170.

(ix) Specific directions concerning the storage and disposal of the pesticide and its container, meeting the requirements of 40 CFR Part 165. These instructions shall be grouped and appear under the heading "Storage and Disposal." This heading must be set in type of the same minimum sizes as required for the child hazard warning. (See Table in § 162.10(h)(1)(iv))

(x) Any limitations or restrictions on use required to prevent unreasonable adverse effects, such as:

(A) Required intervals between application and harvest of food or feed crops.

(B) Rotational crop restrictions.

(C) Warnings as required against use on certain crops, animals, objects, or in or adjacent to certain areas.

(D) [Reserved]

(E) For restricted use pesticides, a statement that the pesticide may be applied under the direct supervision of a certified applicator who is not physically present at the site of application but nonetheless available to the person applying the pesticide, unless the Agency has determined that the pesticide may only be applied under the direct supervision of a certified applicator who is physically present.

(F) Other pertinent information which the Administrator determines to be necessary for the protection of man and the environment.

(j) *Statement of Use Classification.* By October 22, 1976, all pesticide products must bear on their labels a statement of use classification as described in paragraphs (j) (1) and (2) of this section. Any pesticide product for which some uses are classified for general use and others for restricted use shall be separately labeled according to the labeling standards set forth in this subsection, and shall be marketed as separate products with differen registration numbers, one bearing directions only for general use(s) and the other bearing directions for restricted use(s) except that, if a product has both restricted use(s) and general use(s), both of these uses may appear on a product labeled for restricted use. Such products shall be subject to the provisions of § 162.10(j)(2).

(1) *General Use Classification.* Pesticide products bearing directions for use(s) classified general shall be labeled with the exact words "General Classification" immediately below the heading "Directions for Use." And reference to the general classification that suggests or implies that the general utility of the pesticide extends beyond those purposes and uses contained in the Directions for Use will be considered a false or misleading statement under the statutory definitions of misbranding.

(2) *Restricted Use Classification.* Pesticide products bearing direction for use(s) classified restricted shall bear statements of restricted use classification on the front panel as described below:

(i) *Front panel statement of restricted use classification.* (A) At the top of the front panel of the label, set in type of the same minimum sizes as required for human hazard signal words (see table in § 162.10(h)(1)(iv)), and appearing with sufficient prominence relative to other text and graphic material on the front panel to make it unlikely to be overlooked under customary conditions of purchase and use, the statement "Restricted Use Pesticide" shall appear.

(B) Directly below this statement on the front panel, a summary statement of the terms of restriction imposed as a precondition to registration shall appear. If use is restricted to certified applicators, the following statement is required: "For retail sale to and use only by Certified Applicators or persons under their direct supervision and only for those uses covered by the Certified Applicator's certification." If, however, other regulatory restrictions are imposed, the Administrator will define the appropriate wording for the terms of restriction by regulation.

(k) Advertising. [Reserved]

[40 FR 28268, July 3, 1975; 40 FR 32329, Aug. 1, 1975; 40 FR 36571, Aug. 21, 1975, as amended at 43 FR 5786, Feb. 9, 1978]

PHYS/CHEM-1

PHYSICAL/CHEMICAL HAZARDS

Criteria	Required Label Statement
I. Pressurized Containers	
A. Flashpoint at or below 20°F; or if there is a flashback at any valve opening.	Extremely flammable. Contents under pressure. Keep away from fire, sparks, and heated surfaces. Do not puncture or incinerate container. Exposure to temperatures above 130°F may cause bursting.
B. Flashpoint above 20°F and not over 80°F; or if the flame extension is more than 18 inches long at a distance of 6 inches from the valve opening.	Flammable. Contents under pressure. Keep away from heat, sparks, and flame. Do not puncture or incinerate container. Exposure to temperatures above 130°F may cause bursting.
C. All Other Pressurized Containers	Contents under pressure. Do not use or store near heat or open flame. Do not puncture or incinerate container. Exposure to temperatures above 130°F may cause bursting.
II. Non-Pressurized Containers	
A. Flashpoint at or below 20°F.	Extremely flammable. Keep away from fire, sparks, and heated surfaces.
B. Flashpoint above 20°F and not over 80°F.	Flammable. Keep away from heat and open flame.
C. Flashpoint over 80°F and not over 150°F.	Do not use or store near heat and open flame.
D. Flashpoint above 150°F.	None required.

STOR-1

STORAGE INSTRUCTIONS FOR PESTICIDES

Heading:

All products are required to bear specific label instructions about storage and disposal. Storage and disposal instructions must be grouped together in the directions for use portion of the label under the heading STORAGE AND DISPOSAL. Products intended solely for domestic use need not include the heading "STORAGE AND DISPOSAL."

Storage Instructions:

All product labels are required to have appropriate storage instructions. Specific storage instructions are not prescribed. Each registrant must develop his own storage instructions, considering, when applicable, the following factors:

1. Conditions of storage that might alter the composition or usefulness of the pesticide. Examples could be temperature extremes, excessive moisture or humidity, heat, sunlight, friction, or contaminating substances or media.

2. Physical requirements of storage which might adversely affect the container of the product and its ability to continue to function properly. Requirements might include positioning of the container in storage, storage or damage due to stacking, penetration of moisture, and ability to withstand shock or friction.

3. Specifications for handling the pesticide container, including movement of container within the storage area, proper opening and closing procedures (particularly for opened containers), and measures to minimize exposure while opening or closing container.

4. Instructions on what to do if the container is damaged in any way, or if the pesticide is leaking or has been spilled, and precautions to minimize exposure if damage occurs.

5. General precautions concerning locked storage, storage in original container only, and separation of pesticides during storage to prevent cross-contamination of other pesticides, fertilizer, food, and feed.

6. General storage instructions for household products should emphasize storage in original container and placement in locked storage areas.

PEST/DIS-1

PESTICIDE DISPOSAL INSTRUCTIONS

The label of all products, except those intended solely for domestic use, must bear explicit instructions about pesticide disposal. The statements listed below contain the exact wording that must appear on the label of these products:

1. The labels of all products, except domestic use, must contain the statement, "Do not contaminate water, food, or feed by storage or disposa

2. Except those products intended solely for domestic use, the labels of all products that contain active ingredients that are Acute Hazardous Wastes (see list in this Appendix) or are assigned to Toxicity Category I on the basis of oral or dermal toxicity, skin or eye irritation potenti or Toxicity Category I or II on the basis of acute inhalation toxicity must bear the following pesticide disposal statement:

> "Pesticide wastes are acutely hazardous. Improper disposal of excess pesticide, spray mixture, or rinsate is a violation of Federal Law. If these wastes cannot be disposed of by use according to label instructions, contact your State Pesticide or Environmental Control Agency, or the Hazardous Waste representative at the nearest EPA Regional Office for guidance."

3. The labels of all products, except those intended for domestic use, containing active or inert ingredients that are Toxic Hazardous Wastes (see list in this Appendix) or meet any of the criteria in 40 CFR 261, Subpart C for a hazardous waste must bear the following pesticide disposa statement:

> "Pesticide wastes are toxic. Improper disposal of excess pesticide, spray mixture, or rinsate is a violation of Federal Law. If these wastes cannot be disposed of by use according to label instructions, contact your State Pesticide or Environmental Control Agency, or the Hazardous Waste representative at the nearest EPA Regional Office for guidance."

4. Labels for all other products, except those intended for domestic use, must bear the following pesticide disposal statement:

> "Wastes resulting from the use of this product may be disposed of on site or at an approved waste disposal facility."

5. Products intended for domestic use only must bear the following disposal statement: "Securely wrap original container in several layers of newspaper and discard in trash."

PESTICIDE ACTIVE INGREDIENTS THAT ARE ACUTE HAZARDOUS WASTES

I. PESTICIDES ON THE "E" LIST (with RCRA # and CAS #) [40 CFR 261.33(e)]

Acrolein	P003	107-13-1
Aldicarb	P070	116-06-3
Aldrin	P004	309-00-2
Allyl alcohol	P005	107-18-6
Aluminum phosphide	P006	1302-45-0
4-Aminopyridine (Avitrol)	P008	504-24-5
Arsenic acid	P010	7778-39-4
Arsenic pentoxide	P011	1303-28-2
Arsenic trioxide	P012	1327-53-3
Calcium cyanide	P021	592-01-8
Carbon disulfide	P022	75-15-0
p-Chloroaniline	P024	106-47-8
Cyanides (soluble cyanide salts not otherwise specified)	P030	
Cyanogen chloride	P031	506-77-4
Dieldrin	P037	60-57-1
O,O-Diethyl S-[2-ethylthio)ethyl] phosphorodithioate (disulfoton)	P039	298-04-4
O,O-Diethyl O-pyrazinyl phosphorothioate (Zinophos®)	P040	297-97-2
Dimethoate	P044	60-51-5
O,O-Dimethyl O-p-nitrophenyl phosphorothioate (methyl parathion)	P071	298-00-0
4,6-Dinitro-o-cresol and salts	P047	534-52-1
4,6-Dinitro-o-cyclohexylphenol	P034	131-89-5
Dinoseb	P020	88-85-7
Endosulfan	P050	115-29-7
Endothall	P088	129-67-9
Endrin	P051	72-20-8
Famphur	P097	52-85-7
Fluoroacetamide	P057	640-19-7
Heptachlor	P059	76-48-8
Hexachlorohexahydro-exo,exo-dimethanonaphthalene (Isodrin)	P069	465-73-6
Hydrocyanic acid	P063	74-90-8
Methomyl	P066	16752-77-5
alpha-Naphthylthiourea (ANTU)	P072	86-88-41
Nicotine and salts	P075	54-11-5
Octamethylpyrophosphoramide (OMPA, schradan)	P085	152-16-9
Parathion	P089	56-38-2
Phenylmercuric acetate (PMA)	P092	62-38-4
Phorate	P094	298-02-2
Potassium cyanide	P098	151-50-8
Propargyl alcohol	P102	107-19-7
Sodium azide	P105	26628-22-8
Sodium cyanide	P106	143-33-9
Sodium fluoroacetate	P058	62-74-8

Strychnine and salts	P108	57-24-9 60-41-3
O,O,O,O-Tetraethyl dithiopyrophosphate (sulfotepp)	P109	3689-24-5
Tetraethyl pyrophosphate	P111	107-49-3
Thallium sulfate	P115	7446-18-6
Thiofanox	P045	39196-18-4
Toxaphene	P123	8001-35-2
Warfarin (>0.3%)	P001	81-81-2
Zinc phosphide (>10%)	P122	1314-84-7

50 ACTIVES

II. PESTICIDES DERIVED FROM TRI-, TETRA-, AND PENTACHLOROPHENOLS [40 CFR 261.31]

2-Chloroethyl 2-(2,4,6-trichlorophenoxy) ethyl ether	F027	5324-22-1
Dehydroabietylammonium pentachlorophenoxide	F027	35109-57-0
Erbon	F027	136-25-4
O-ethyl O-(2,4,5-trichlorophenyl) ethylphosphonothioate	F027	327-98-0
2,2'-Methylenebis (3,4,6-trichlorophenol) (Hexachlorophene)	F027	70-30-4
--Potassium salt of	F027	67923-62-0
--Sodium salt of	F027	3247-34-5
--Disodium salt of	F027	5736-15-2
Pentachlorophenol	F027	87-86-5
--Potassium salt of	F027	7778-73-6
--Sodium salt of	F027	131-52-2
--Zinc salt of	F027	2917-32-0
--Zinc salt of N-alkyl (C_{16}-C_{18})-1,3-propanediamine	F027	
--Pentachlorophenyl laurate	F027	3772-94-9
Potassium trichlorophenate (2,4,6)	F027	2591-21-1
Potassium trichlorophenate (2,4,5)	F027	35471-43-3
Silvex	F027	93-72-1
--2-Butoxyethyl ester	F027	19398-13-1
--Butoxypolypropoxypropyl ester	F027	53404-07-2
--Butoxypropyl ester	F027	25537-26-2
--Diethanolamine salt	F027	51170-59-3
--Diisopropanolamine salt	F027	53404-09-4
--Dimethylamine salt	F027	55617-85-1
--Dipropylene glycol isobutyl ether ester	F027	53535-26-5
--Ethanolamine salt	F027	7374-47-2
--2-Ethylhexyl ester	F027	53404-76-5
--Isooctyl ester	F027	53404-14-1

--Isopropanolamine salt	F027	53404-13-0
--Monohydroxylaluminum salt	F027	69622-82-8
--Polypropoxypropyl ester	F027	83562-66-7
--Potassium salt	F027	2818-16-8
--Propylene glycol isobutyl ether ester	F027	53466-84-5
--Sodium salt	F027	37913-89-6
--Triethanolamine salt	F027	17369-89-0
--Triethylamine salt	F027	53404-74-3
--Triisopropanolamine salt	F027	53404-75-4
--Tripropylene glycol isobutyl ether ester	F027	53535-30-1
Sodium 2-(2,4,5-trichlorophenoxy) ethyl sulfate	F027	3570-61-4
Tetrachlorophenols	F027	25167-83-3
--Alkylamine*amine salt (as in fatty acids of coconut oil)	F027	
--Potassium salt	F027	53535-27-6
--Sodium salt	F027	25567-55-9
2,4,5-Trichlorophenol	F027	95-95-4
2,4,6-Trichlorophenol	F027	88-06-2
2,4,5-Trichlorophenol salt of 2,6-bis[(dimethylamino)methyl] cyclohexanone	F027	53404-83-4
2,4,5-Trichlorophenol, sodium salt	F027	136-32-3
2,4,6-Trichlorophenol, sodium salt	F027	3784-03-0
2,4,5-Trichlorophenoxyacetic acid	F027	93-79-8
--Alkyl C-12 amine salt	F027	53404-84-5
--Alkyl C-13 amine salt	F027	53404-85-6
--Alkyl C-14 amine salt	F027	53535-37-8
--N,N-diethylethanolamine salt	F027	53404-86-7
--Dimethylamine salt	F027	6369-97-7
--N,N-dimethyllinoleylamine salt	F027	53404-88-9
--N,N-dimethyloleylamine salt	F027	53404-89-0
--N-oleyl-1,3-propylene diamine salt	F027	53404-87-8
--Sodium salt	F027	13560-99-1
--Triethanolamine salt	F027	3813-14-7
--Triethylamine salt	F027	2008-46-0
--Alkyl (C3H7 - C7H9) ester	F027	
--Amyl ester	F027	120-39-8
--Butoxyethoxypropyl ester	F027	1928-58-1
--2-Butoxyethyl ester	F027	2545-59-7
--Butoxypropyl ester	F027	1928-48-9
--Butyl ester	F027	93-79-8
--Dipropylene glycol isobutyl ether ester	F027	53535-31-2
--2-Ethylhexyl ester	F027	1928-47-8
--Isobutyl ester	F027	4938-72-1

--Isopropyl ester	F027	93-78-7
--Propylene glycol isobutyl ether ester	F027	53466-86-7
--Tripropylene glycol isobutyl ether ester	F027	53535-32-3
4-(2,4,5-Trichlorophenoxy)butyric acid [2,4,5-TB]	F027	93-80-1
2-(2,4,5-Trichlorophenoxy)ethyl hydrogen sulfate [2,4,5-TES]	F027	69633-04-1
1,4',5'-Trichloro-2'-(2,4,5-trichlorophenoxy) methanesulfonanilide [Edolan U]	F027	69462-14-2

PESTICIDES THAT ARE TOXIC HAZARDOUS WASTES

PESTICIDES ON THE "F" LIST [40 CFR 261.33(f)] (with	RCRA #, and	CAS #
Acetone	U002	67-64-1
Acrylonitrile*	U009	107-13-1
Amitrole	U011	61-82-5
Benzene*	U019	71-43-2
Bis(2-ethylhexyl)phthalate	U028	117-81-7
Cacodylic acid	U136	75-60-5
Carbon tetrachloride*	U211	56-23-5
Chloral (hydrate) (chloroacetaldehyde)	U034	302-17-0
Chlordane, technical*	U036	57-74-9
Chlorobenzene*	U037	108-90-7
4-Chloro-m-cresol	U039	59-50-7
Chloroform*	U044	67-66-3
o-Chlorophenol	U048	95-57-8
Creosote	U051	8021-39-4
Cresylic acid (cresols)*	U052	1319-77-3
Cyclohexane	U056	110-82-7
Cyclohexanone	U057	108-94-1
Decachlorooctahydro-1,3,4-metheno-2H-cyclobuta[c,d]-pentalen-2-one (Kepone, chlordecone)	U142	143-50-0
1,2-Dibromo-3-chloropropane (DBCP)	U066	96-12-8
Dibutyl phthalate	U069	84-74-2
S-2,3-(Dichloroallyl diisopropyl-thiocarbamate) (diallate,Avadex)	U062	2303-16-4
o-Dichlorobenzene*	U070	95-50-1
p-Dichlorobenzene*	U072	106-46-7
Dichlorodifluoromethane (Freon 12®)	U075	75-71-8
3,5-Dichloro-N-(1,1-dimethyl-2-propynyl) benzamide (pronamide, Kerb®)	U192	23950-58-5
Dichloro diphenyl dichloroethane (DDD)	U060	72-54-8
Dichloro diphenyl trichloroethane (DDT)	U061	50-29-3
Dichloroethyl ether	U025	1191-17-9
2,4-Dichlorophenoxyacetic, salts and esters (2,4-D)*	U240	94-75-7
1,2-Dichloropropane	U083	8003-19-8
1,3-Dichloropropene (Telone)	U084	542-75-6
Dimethyl phthalate	U102	131-11-3
Epichlorohydrin (1-chloro-2,3-epoxypropane)	U041	106-89-8
Ethyl acetate	U112	141-78-6
Ethyl 4,4'-dichlorobenzilate (chlorobenzilate)	U038	510-15-6

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*Proposed for deletion by TCLP proposal

Ethylene dibromide (EDB)	U067	106-93-4
Ethylene dichloride*	U077	107-06-2
Ethylene oxide	U115	75-21-8
Formaldehyde	U122	50-00-0
Furfural	U125	98-01-1
Hexachlorobenzene*	U127	118-74-1
Hexachlorocyclopentadiene	U130	77-47-4
Hexachloroethane*	U131	67-72-1
Hydrofluoric acid	U134	7664-39-3
Isobutyl alcohol*	U140	78-83-1
Lead acetate	U144	301-04-2
Lindane*	U129	58-89-9
Maleic hydrazide	U148	123-33-1
Mercury	U151	7439-97-6
Methoxychlor*	U247	72-43-5
Methyl alcohol (methanol)	U154	67-56-1
Methyl bromide	U029	74-83-9
Methyl chloride	U045	74-87-3
2,2'-Methylenebis (3,4,6-trichlorophenol) (hexachlorophene) [acute waste per 261.31]	U132	70-30-4
Methylene chloride*	U080	75-09-2
Methyl ethyl ketone*	U159	78-93-3
4-Methyl-2-pentanone (methyl isobutyl ketone)	U161	108-10-1
Naphthalene	U165	91-20-3
Nitrobenzene*	U169	98-95-3
p-Nitrophenol	U170	100-02-7
Pentachloroethane	U184	76-01-7
Pentachloronitrobenzene (PCNB)	U185	82-68-8
Pentachlorophenol* [acute waste per 261.31]	U242	87-86-5
Phenol*	U188	108-95-2
Pyridine*	U196	110-86-1
Resorcinol	U201	108-46-3
Safrole	U203	94-59-7
Selenium disulfide	U205	7488-56-4
Silvex [acute waste per 261.31]	U233	93-72-1
1,1,2,2-Tetrachloroethane*	U209	79-34-5
Tetrachloroethylene*	U210	127-18-4
2,3,4,6-Tetrachlorophenol* [acute waste per 261.31]	U212	
Thiram	U244	137-26-8
Toluene*	U220	108-88-3
1,1,1-Trichloroethane* (methyl chloroform)	U226	71-55-6
Trichloroethylene*	U228	79-01-6
Trichloromonofluoromethane (Freon 11®)	U121	75-69-4
2,4,5-Trichlorophenol* [acute waste per 261.31]	U230	95-95-4
2,4,6-Trichlorophenol* [acute waste per 261.31]	U231	88-06-2

2,4,5-Trichlorophenoxyacetic acid (2,4,5-T)* [acute waste per 261.31]	U232	93-76-5
Warfarin (<0.3%)	U248	81-81-2
Xylene	U239	1330-20-7
Zinc phosphide (<10%)	U249	1314-84-7

83 ACTIVES

CONTAINER DISPOSAL INSTRUCTIONS

The label of each product must bear container disposal instructions appropriate to the type of container.

1. Domestic use products must bear one of the following container disposal statements:

Container Type	Statement
Non-aerosol products (bottles, cans, jars)	Do not reuse container (bottle, can, jar). Rinse thoroughly before discarding in trash.
Non-aerosol products (bags)	Do not reuse bag. Discard bag in trash.
Aerosol products	Replace cap and discard containers in trash. Do not incinerate or puncture.

2. All other products must bear container disposal instructions, based on container type, listed below:

Container Type	Statement
Metal containers (non-aerosol)	Triple rinse (or equivalent). Then offer for recycling or reconditioning, or puncture and dispose of in a sanitary landfill, or by other procedures approved by state and local authorities.
Plastic containers	Triple rinse (or equivalent). Then offer for recycling or reconditioning, or puncture and dispose of in a sanitary landfill, or incineration, or, if allowed by state and local authorities, by burning. If burned, stay out of smoke.
Glass containers	Triple rinse (or equivalent). Then dispose of in a sanitary landfill or by other approved state and local procedures.
Fiber drums with liners	Completely empty liner by shaking and tapping sides and bottom to loosen clinging particles. Empty residue into application equipment. Then dispose of liner in a sanitary landfill or by incineration if allowed by state and local authorities. If drum is contaminated and cannot be reused[1], dispose of in the same manner.
Paper and plastic bags	Completely empty bag into application equipment. Then dispose of empty bag in a sanitary landfill or by incineration, or, if allowed by State and local authorities, by burning. If burned, stay out of smoke.
Compressed gas cylinders	Return empty cylinder for reuse (or similar wording)

1/ Manufacturer may replace this phrase with one indicating whether and how fiber drum may be reused.

III. EPA INDEX TO PESTICIDE CHEMICALS

Index to Pesticide Chemicals - Pentachloronitrobenzene

EPA Index to Pesticide Chemicals

PENTACHLORONITROBENZENE

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c056502

PENTACHLORONITROBENZENE*

TYPE PESTICIDE: Fungicide

FORMULATIONS:

Tech	(94%, 95%, 96%, 97%)
FI	(80%, 90%)
D	(10%, 20%, 25%, 30%, 40%)
G	(2%, 2.25%, 2.5%, 3.75%, 4.67%, 5%, 6.5%, 9.95%, 10%, 12.5%, 13.57%, 15.4%, 16.9%, 30%)
WP	(14%, 30%, 35%, 75%)
EC	(12.5%, 22.9%, 23.2%, 23.4%, 23.8%, 23.9%, 24%, 24.7%, 26.49%)
FlC	(17%)
RTU	(10%, 17.68%, 20%, 22.6%, 23.1%, 23.2%, 23.7%, 24%, 25%)

GENERAL WARNINGS AND LIMITATIONS: The following protective clothing are required during mixing/loading operations: gloves, long-sleeved shirt, long pants, socks and shoes. Do not plant any root crops not registered for Pentachloronitrobenzene (PCNB) in rotation on PCNB treated soil. Do not feed or graze treated foliage. Do not use treated seed for food, feed or oil purposes. Do not feed cotton gin waste to livestock. Do not allow hogging down of peanuts. Consult State Agricultural Extension Service for additional information, as the timing, number, and rate of applications needed will vary with local conditions. Dosage rates are given in active ingredient.

Definition of terms:

Tablespoons (tbls)/teaspoons (tsp) actual: A hypothetical quantity computed by multiplying the number (or equivalent number) of tablespoons or teaspoons of product by the concentration (percentage) of active ingredient in the formulation.

Agricultural Crop Tolerances (other than those listed in the report):
Interim tolerances: 0.1 ppm on bananas

Agricultural Seed Treatments: The Federal Seed Act requires that seed treated with a pesticide must contain a dye whicn imparts an unnatural color to the seed if the seed is intended to be moved in interstate commerce. Apply dust formulations in planter box.

*PCNB
Terraclor

	Site and Pest	Dosages and Formulation(s)	Tolerance, Use, Limitations
	TERRESTRIAL FOOD CROP		
	(Agricultural crops)		
/08063AA	Barley (seed)		N.F.
FLAEUAL	Covered smut (Ustilago)	0.03-0.064 lb/bu (20%, 25% D) (23.2-25% EC) (23.1-23.7% RTU) or 0.039-0.136 lb/100 lb (17% FLC) (17.68% RTU) (2.23 lb/gal or 24% RTU) (1.72-1.8 lb/gal or 20% RTU)	Seed treatment. Apply as a dry mix or as a slurry or liquid, mixed at recommended dilutions. Use appropriate slurry or liquid treating equipment. May be formulated with lindane;5-ethoxy-3-(trichloromethyl)-1,2,4-thiadiazole; xylene; or carboxin.
/15003AA	Beans (snap)		0.1 ppm (interim)
/15001AA	Beans (dry)		0.1 ppm (interim)
FHANSAQ	White mold (Sclerotinia)	2.0-2.06 lb/8-10 gal/A [14,500 ft of row (bush) or 8,430 ft of row (pole)] (75% WP/D) (2 lb/gal or 23.8%-24% EC)	Apply a maximun of 7.5 pounds per acre per season. Soil application Row treatment. Apply as a spray in 8 inch band centered on row immediately after or at time of seeding. If disease is severe, repeat application at 2 to 3 week intervals. Use 1 or 2 nozzles per row, directing spray at base of plant. Do not apply after first bloom. Soil should remain undisturbed after treatment. Avoid applying directly to seed as delayed emergence may occur.
/28001AA	Beans (seed)		0.1 ppm (interim)
FKAGFAK FKAGRAM FKAGPES	Fusarium Rhizoctonia Pythium	0.053 lb/100 lb (1.8 lb/gal or 20% RTU)	Seed treatment. Apply product undiluted to seed or dilute 5 parts product to 1 part water. Use appropriate liquid or slurry treating equipment. Formulated with 5-ethoxy3-(trichloromethyl)-1,2,4 thiadiazole.

	Site and Pest	Dosages and Formulation(s)	Tolerance, Use, Limitations
/28001AA	Beans (seed)		0.1 ppm (interim)
FKAGRAM FKAGPES FKAGFAK FKAGTAK	Rhizoctonia Pythium Fusarium Thielaviopsis	0.025-0.04 lb/bu (20% D) (24.7% EC) (23.1-23.2% RTU)	Planter-box seed treatment. Premix with seed at specified rates directly in planter-box at planting time or use other suitable premix equipment. The ready-to-use formulation may be applied undiluted to seed or mixed with one part product to 2 parts water as required for seed coverage. May be formulated with 5-ethoxy-3-trichloromethyl)-1,2,4-thiadiazole.
/15002AA	Beans (lima)		0.1 ppm (interim)
/15001AA	Beans (kidney)		0.1 ppm (interim)
FICBRAM	Root rot (Rhizoctonia)	1.0-1.5 lb/A (10% G)	Soil application. Row treatment. Apply at planting time. Use planter and mixer attachment. Use appropriate calibrations for seeding rates. May be formulated with and captan.
FICHPES	Stem rot (Phythium)		
/15003AA	Beans (green)		0.1 ppm (interim)
/15002AA	Beans (lima)		0.1 ppm (interim)
/15003AA	Beans (snap)		0.1 ppm (interim)
FKAGRAM	Rhizoctonia solani	0.65-0.975 lb/A (6.5% G)	Soil application. Row treatment. Apply at planting time as a side dress on each side of row. Do not apply directly on seed. Do not apply more than once per season. Plant injury may occur under such conditions as extremely cool, wet or extremely dry weather, or if product is applied with certain pre-emergent herbicides. Formulated with O,O-diethyl S-(2-(ethylthio)ethyl) phosphorodithioate.

PENTACHLORONITROBENZENE

	Site and Pest	Dosages and Formulation(s)	Tolerance, Use, Limitations
	Beans (green) cluster (continued)		
FICBRAM	Root rot (Rhizoctonia)	0.75-2.0 lb/A [14,500 ft of row (bush), or 8,430 ft of row (pole)] (10% G) (30% G) (75% WP) (2 lb/gal or 23.8-24% EC	Soil application. Row treatment. Apply at planting time as dry formulation to planting furrow and covering soil. Or mix with 8 to 10 gallons of water per acre and apply as a spray. In Arizona and California apply 0.75 to 1.016 pounds per 8 to 10 gallons of water and apply in-furrow at planting. Avoid applying to bare seed. Use lower rates for lighter soils.
FICHRAM	Stem rot (Rhizoctonia)		
/13005AA	**Broccoli**		0.1 ppm (interim)
/13006AA	**Brussels Sprouts**		0.1 ppm (interim)
/13007AA	**Cabbage**		0.1 ppm (interim)
FEACPCU	Club root (Plasmodiophora)	20-40 lb/A [13,000 ft or row] (10% G) (75% WP)	Soil application. Row treatment. Apply in 12 to 15 inch band and rototill to depth of 4 to 6 inches immediately prior to planting. Use lower rate on light soils and higher rates on heavy soils.
		1.5-4.5 lb/100 gal [transplant] at 0.5-0.75 pt/plant (75% WP)	As transplant solution. Apply 0.5 to 0.75 pint per plant. Agitate to hold powder in solution. May also be used in transplanting water or sprayed on soil surface and disced in prior to planting.
FIAGCEF	Wire stem or Black root (Corticium)	7.5-11.25 lb/A [13,100 ft of row] (75% WP)	Soil application. Row treatment. Apply as a drench in 35 gallons of water or more as above.

	Site and Pest	Dosages and Formulation(s)	Tolerance, Use, Limitations
/13005AA	Broccoli		0.1 ppm (interim)
/13006AA	Brussels Sprouts		0.1 ppm (interim)
/13007AA	Cabbage		0.1 ppm (interim)
/13008AA	Cauliflower		0.1 ppm (interim)
FEACPCU	Club root (Plasmodiophora)	30.0-60.0 lb/A (broadcast) (10% G) (75% WP)	Preplant soil application. Broadcast application. Apply product to soil surface prior to transplanting. Disc or cross-disc or rototill to depth of 4 to 6 inches. Mix thoroughly with soil. Use lower rate for lighter soils and higher rate for heavier soils.
FIAGCEF	Wire stem or Black root (Corticium)	11.25-15.0 lb in not less than 50 gal/A (drench) (75% WP)	Soil application. Broadcast drench treatment. Apply as soil drench immediately after or at time of seeding. Or for smaller areas use 0.75 tablespoon actual* per 1 gallon of water as soil drench for 50 square feet of seed bed with a watering can.
/13008AA	Cauliflower		0.1 ppm (interim)
FEACPCU	Club root (Plasmodiophora)	19.62-40.0 lb/A [10,000 ft of row] (10% G) (75% WP)	Soil application. Row treatment. Apply in 12 to 15 inch band and rototill to depth of 4 to 6 inches immediately prior to planting.
		1.4-4.5 lb/150 gal at 0.5-0.75 pt/plant [transplant] (75% WP)	As transplant solution. Apply 0.5 to 0.75 pint per plant. Agitate to hold powder in suspension.
FIAGCEF	Wire stem or Black root (Corticium)	5-15 lb/A [10,900 ft of row] (10% G)	Soil application. Row treatment. Apply in 8 inch band, centered on row, immediately prior to seeding. Rototill to depth of 2 inches.

	Site and Pest	Dosages and Formulation(s)	Tolerance, Use, Limitations
	Cauliflower (continued)		
		7.5-11.25 lb/A [10,900 ft of row] (drench) (75% WP)	Soil application. Row treatment. Apply as a drench using 35 gallons of water per acre. Apply in an 6 inch band centered on the row, immediately prior to seeding and rototill to a depth of 2 inches.
/28005AA	Corn (seed)		N.F.
FKAGRAM FKAGPES FKAGFAK FKAGTAK FLAMUAL	Rhizoctonia Pythium Fusarium Thielaviopsis Common smut (Ustilago maydis)	0.025-0.046 lb/100 lb (20% D) (23.2-24.7% EC) (1.8 lb/gal or 20% RTU) 23.1-23.2% RTU)	Seed treatment. Apply dust in planter box . Liquid formulations may be applied undiluted to seed, or dilute 5 parts flowable liquid concentrate to one part water or one part ready-to-use to 2 parts water and apply using suitable treating equipment. May be formulated with 5-ethoxy-3-(trichloromethyl)-1,2,4-thiadiazole.
/28007AA	Cotton (seed)		0.1 ppm (negligible residue)
FKAAQBB FKABQBB FKAFQBB FKAHRAM FKAGPES FKAFFAK FKANQBB	Damping off Seed rot Seedling rot Rhizoctonia Pythium Fusarium Seedling disease complex	0.3-1.0 lb/A (10% D) (20% D) (10% G) or -- (30% D) or 0.2-0.3 lb/A [13,000 ft of row or 40 in. row spacing] (20% D) or 0.6-3.0 lb/100 lb (10% D) (20% D) (40% D)	Seed application. Apply to seed at planting time thru planter box. Mix product with seed in planter box. This is a supplementary treatment which may be used in addition to regular seed treatment. Recalibrate planter to proper seeding rate after adding the suggested dosage of product. Follow labeling recommendations. May be formulated with thiram, captan and 5-ethoxy-3-(trichloromethyl)-1,2,4-thiadiazole.

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Cotton (seed) (continued)

	Site and Pest	Dosages and Formulation(s)	Tolerance, Use, Limitations
FKADQAB	Soilborne plant diseases	0.25-0.6 lb/A (5% G) (10% G)	Soil application. Seed application. For hill drop application, apply in seed furrow and cover with soil at depth of 2 inches or more at rates shown below:
FKAGRAM	Rhizoctonia		
FKAGPES	Pythium		
FKAGFAK	Fusarium		
FKANQBB	Seedling disease complex		

Hill drop rates:

Hill spacing	pounds/acre	ounces/1000 ft of row
	5% G	
12 in.	0.20	none given
20 in.	0.125	none given
	10% G	
12 in.	0.85	1.05
20 in.	0.65	0.7

Treatment is not intended as a substitute for regular fungicide treatment. Do not drill this product if seed is hill dropped.
May be formulated with captan, 5-ethoxy-3-(trichloromethyl)-1,2,4-thiadiazole or aldicarb.

	Site and Pest	Dosages and Formulation(s)	Tolerance, Use, Limitations
FKAAQBB	Damping off	0.3 lb/A (10% G)	Soil application. Seed application. For hill drop seeding rate apply to planting furrow and covering soil. Use planter box at rate of 0.3 pounds per acre which correspond to the following hill drop rates.
FKAHRAM	Rhizoctonia (soreshin)		
FKANQBB			
FKAGPES	Pythium		
FKABQBB	Seed rot		
FKAFQBB	Seedling rot		
XXXXXXX	Seedling disease complex		

row spacing Row Spacing	1.5 pounds/acre Hill Drop Rate
16 in.	2.5 pounds/acre
30 in.	1.5 pounds/acre

Mix in planter box or premix in separate container and transfer to planter box.
Formulated with captan.

	Site and Pest	Dosages and Formulation(s)	Tolerance, Use, Limitations
	Cotton (seed) (continued)		
FKAQBB FKAGRAM FKAGPES FKAGFAK FKANQBB	Damping off Rhizoctonia Pythium Fusarium Seedling disease complex	0.325-0.975 lb/A [drill row] (6.5% G)	Soil application. Apply near seeds and over covering soil in-furrow at planting time with granular applicator, based on 13,000 feet of row with 40 inch row spacing. Use lower dosage for hill drop application and higher dosage for drill planting application method. Use of systemic insecticides can possibly result in damage to seed germination or stunting of seedlings under adverse conditions such as extremely cold or wet or extremely dry weather. Such damage may be more pronounced in light, sandy soils or when used with certain preemergence herbicides. May be formulated with O,O-diethyl S-[2-(ethylthio)ethyl] phosphoro dithioate, phorate or 5-ethoxy-3-(trichloromethyl)-1,2,4-thiadiazole.
FKAAQBB FKABQBB FKAFQBB FKAGRAM FKAGPES FKAGFAK FKANQBB FKAGTAK	Damping off Seed rot Seedling rot Rhizoctonia Pythium Fusarium Seedling disease complex Thielaviopsis	0.5-5.0 lb/A (5% G) (6.5% G) (10% G)	Soil application. Seed application. Apply at planting time to open furrow over seed and to covering soil using appropriate equipment and placement procedures. Product may also be applied as a side dress in a band, on each side of furrow, or as seedbed treatment; or as a greenhouse treatment. May be formulated with O,O-diethyl S-[2-(ethylthio)ethyl] phosphorodithioate, phorate, thiram, captan, 5-ethoxy-3(trichloromethyl)-1,2,4-thiadiazole or aldicarb.
FKAAQBB FKAGRAM FKAGPES FKAGTAK FKAGFAK FKAGPCN	Damping off Rhizoctonia Pythium Thielaviopsis Fusarium Phytophthora	0.188-0.263 lb/100 lb (75% WP) (23.2% RTU)	Seed treatment. Apply undiluted product to seed or dilute by adding water. Use treating equipment. Also product may be transferred to a slurry tank equipped with a positive agitator. The dye phase is contained on a micronized solid, therefore, must be agitated prior to use. It should be recirculated through the pump system for at least

	Site and Pest	Dosages and Formulation(s)	Tolerance, Use, Limitations
	Cotton (seed) (continued)		
			5 minutes before filling treater reservoir. May be formulated with 5-ethoxy-3-(trichloromethyl)-1,2,4-thiadiazole.
FKAAQBB FDABQBB FKAFQBB FKAHRAM FKAGPES FKAGFAK	Damping off Seed rot Seedling rot Rhizoctonia (soreshin) Pythium Fusarium	1.0-2.06 lb/A [mixed with 5-50 gal] [13,000 ft of row on 40 in. row spacing] (30% WP) (75% WP) (23.2-26.49% EC)	Soil application. Seed application. Apply in-furrow at planting time as spray upon the seed and surrounding soil. May be applied by using two nozzles per furrow. The front nozzle is centered over the furrow to spray the soil around the seed and the rear nozzle to spray the covering soil as it fills the furrow. May be formulated with captan or 5-ethoxy-3-(trichloromethyl)-1,2,4-thiadiazole.
/28007AA	Cotton (acid delinted seed)		0.1 ppm (negligible residue)
FKABQBB FKAGRAM FKAAQBB FKAGPES FKAGFAK FKANQBB	Seed rot Rhizoctonia Damping off Pythium Fusarium Soilborne seedling diseases	0.125-0.26 lb/100 lb (20% WP) (1.72-1.89 lb/gal or 20% RTU) 23.2-24.7%) EC) (2 lb/gal or 22.6-25%) RTU)	Seed treatment. Apply by adding 5 parts product to 1 part water or add equal parts of water to cover the seed. A subsequent soil application may be necessary where Pythium is a problem. May be formulated with 5-ethoxy-3-(trichloromethyl)1,2,4-thiadiazole, or xylene.
FKAAQBB FKAGRAM FKABQBB FKAFQBB	Damping off Rhizoctonia Seed rot Seedling rot	0.25-0.3 lb/A (10-30% D)	Soil application. Seed application. Apply dust to seed through planter box at planting. May be used as a supplement to regular seed treatment. Formulated with captan.

	Site and Pest	Dosages and Formulation(s)	Tolerance, Use, Limitations
/28007AA	Cotton (fuzzy seed)		0.1 ppm (negligible residue)
FKAGRAM	Rhizoctonia	0.25-0.45 lb/A (10% D) (30% D) or 0.037 lb/100 lb (2 lb/gal or 23.2% EC)	Seed treatment. Apply as a dust as undiluted ready-to-use formulation and mix with the seed using suitable treatment equipment. Formulated with 5-ethoxy-3-(trichloromethyl)-1,2,4-thiadiazole.
FKAGPES	Pythium		
FKAGFAK	Fusarium		
FKAGTAK	Thielaviopsis		
FKANQBB	Seedling disease complex		
FKABQBB	Seed rot	0.25-0.45 lb/A (10% D) (30% D)	Soil application. Seed application. Apply to seed at planting through a drill or planter box. Mix dust thoroughly with seed. Before seeding, calibrate planter. May be formulated with captan.
FKAFQBB	Seedling rot		
FKAGRAM	Rhizoctonia		
FKAGPES	Pythium		
FKAGFAK	Fusarium		
FKAGTAK	Thielaviopsis		
/28007AA	Cotton (reginned or mechanically delinted seed)		0.1 ppm (negligible residue)
FKABQBB	Seed rot	0.1-0.25 lb/100 lb (10% D) (20% WP) (1.72-1.89 lb/gal or 20% FlC) (2-2.23 lb/gal or 24% EC) (2 lb/gal or 22.6-24% RTU	Seed treatment. May be applied in dry form through planter box at planting. Thoroughly mix product with seed prior to filling planter box. Apply to seed either undiluted from drum or diluted in various ways such as, 1 part water to 5 parts product or equal parts of water to cover seed. Use suitable liquid or slurry equipment. A subsequent soil application may be necessary where Pythium is a problem. May be formulated with p-(dimethylamino)benzenediazo sodium sulfonate, 5-ethoxy-3-(trichloromethyl)-1,2,4-thiadizole; or xylene.
FKAGRAM	Rhizoctonia		
FKAAQBB	Damping off (preemergence)		
FKAGPES	Pythium		
FKAGFAK	Fusarium		
FKAFQBB	Seedling diseases		
FKADQAB	Soilborne plant diseases		

	Site and Pest	Dosages and Formulation(s)	Tolerance, Use, Limitations
/14007AA	Garlic (cloves)		0.1 ppm (interim)
FICRSAS	White rot (Sclerotium)	20.63 lb/100 gal solution [216 ft of row based on 24 in. row spacing] (75% WP) or 20.0 lb/100 gal/A [21,800 ft of row] (23.8-26.49% EC)	Soil application. Row treatment. Apply in-furrow at planting. Mix emulsifiable concentrate or wettable powder formulation with water and apply as a spray at planting time. Attach suitable spray rig to machine planter. Use 2 nozzles per planting furrow and direct front nozzle to spraybottom of open furrow and "seed" as dropped. Direct rear nozzle to spray covering soil.
/14007EA	Garlic ("seed" cloves)		N.F.
FICRSAS	White rot (Sclerotium)	10.125 lb/1,000 lb "seed" cloves (75% WP)	Seed (clove) treatment. Dust cloves thoroughly and then mist-spray with water containing a commercial sticker to moisten dusted cloves.
/24003AA	Oats (seed)		N.F.
FLAAUAL	Oat smut (Ustilago)	0.03-0.064 lb/bu (2 lb/gal or 25% D) 24-25% EC) or 0.1-0.2 lb/100 lb (24-24.7% EC) (17% FLC) (20-23.7% RTU)	Seed treatment. May be applied to seed undiluted or dilute one part emulsifiable concentrate to 1 part water or 5 parts emulsifiable or ready to use to 1 part water. Use suitable liquid or slurry seed treating equipment. Recalibrate equipment prior to use. Agitate slightly to mix material. May be formulated with xylene; or carboxin.

	Site and Pest	Dosages and Formulation(s)	Tolerance, Use, Limitations
/28015AA	Peanuts (seed)		1.0 ppm (interim)
FKAGRAM FKAGPES FKAGFAK FKAGTAK	Rhizoctonia Pythium Fusarium Thielaviopsis	0.025-0.075 lb/100 lb (10-20% D) (1.8 lb/gal or 20% RTU) or 0.03-0.06 lb/bu (23.1-23.2% RTU)	Seed treatment. Premix the wettable powder formulation with the seed directly in planter box or mix with sufficient water and apply using suitable treating equipment. Liquid formulations may be applied uniluted directly to the seed using suitable liquid or slurry treating equipment. Recalibrate equipmentprior to use. Product may contain non-oil lubricant. May be Formulated with 5-ethoxy-3-(tri-chloromethyl)-1,2,4-thiadiazole; maneb, and captan
FBBCSAS	Southern blight (Sclerotium)	9.75-10.2 lb/A [with 38-42 in. row spacing or 12,500-14,000 ft of row] (10% G) (30% G) (75% WP)	Soil application. Apply at planting in a 12 to 14 inch band centered on the row and mix to a depth of 1.5 to 2 inches or apply in an 8 to 12 inch band and mix to a depth of 2 to 4 inches. Use suitable equipment for in-furrow application. Avoid techniques of application which will allow direct contact of the granules with the seed. May be formulated with p-(dimethylamino)-benzenediazo sodium sulfonate.
FBBCSAS	Southern stem and root rot (Sclerotium)	3.0-3.4 lb/A [12,500 ft of row] (10% G) or 3.0 lb/8-10 gal/A (75% WP)	Soil application. Apply dry formulations as soil mix during each of 3 cultivations. Attach 2 delivery tubes per row ahead of inside cultivator sweeps (one on each side) and adjust to treat a total band 12 inches wide, centered on row. Or, mix wettable powder formulation in 8 to 10 gallons water and apply at the per acre rate.

	Site and Pest	Dosages and Formulation(s)	Tolerance, Use, Limitations
	Peanuts (seed) (continued)		
FBBCSAS	Southern stem and root rot (Sclerotium rolfsii)	9.75-10.2 lb/A [12,500 ft of row] (10% G) (30% G) or 9.75 lb/12,400 ft row or 9.7 lb/8-10 gal (75% WP)	Soil application. Row treatment. Surface band application. Apply at pegging time in 6 to 12 inch band centered on row or directed at plant crown and soil pegging zone or, if cultural practices permit may be applied with land plaster. Or, may be applied as side-dressing (at per acre rate of 0.1 pounds per 124 feet of row). Add to 10 gallons of water per acre to the wettable powder and direct the spray to center of row in 12 inch band to cover crown of plant and pegging zone. If middles are cultivated at same time, attach 2 delivery tubes or nozzels, one to eachside and ahead of cultivator sweeps.Do not use more than one application method during same planting season. May be formulated with O,O-diethyl S-(2-(ethylthio)ethyl) phosphorodithioate.
/28016AA	**Peas** (seed)		N.F.
/28023AA	**Soybeans** (seed)		N.F.
FICBABI	Aphanomyces	0.025-0.051 lb/A (10% D) (20% D) or 0.03-0.06 lb/bu/A (23.2% EC) (2 lb/gal or 10-23.2% RTU)	Seed treatment. Premix dry formulations with seed and apply at planting time through planter box at rate of approximately 1 bushel per acre, or mix 0.8 to 1.6 pounds with 1 gallon of water and apply with slurry treater. Product may contain a non-oil lubricant. Premix undiluted liquid formulations (RTU) with seed just prior to planting. Ready-to-use may be applied as a planter box application but should be flushed with water at end of each day's operation and thoroughly cleaned at end of planting season. (where molybdenum is required, the 4.5 ounce formulated rate is equivalent to 0.25 ounce molybdenum as metallic, per acre). The ready to use formulation may be diluted by adding
FKAGRAM	Rhizoctonia		
FKAGFAK	Fusarium		
FKAGPES	Pythium		
FKAGTAK	Thielaviopsis		

	Site and Pest	Dosages and Formulation(s)	Tolerance, Use, Limitations
	Peas (seed) (continued)		
			1 part product to 2 parts water and applied using suitable treating equipment. Formulated with 5-ethoxy-3-(trichloromethyl)-1,2,4-thiadiazole.
FKAGFAK	Fusarium	0.026-0.75 lb/bu or 0.0525 lb/100 lb (30% D) (24.7% EC) 17% FLC	Seed treatment. May be formulated captan; or carboxin.
FKAGPES	Pythium		
FKAGRAM	Rhizoctonia		
FKAGTAK	Thielaviopsis		
/28016AA	Peas (seed)		N.F.
/28023AA	Soybeans (seed)		N.F.
FKAGFAK	Fusarium	0.053-0.105 lb/100 lb (1.8 lb/gal or 20% RTU)	Seed treatment. Apply undiluted to seed or dilute 1 part water to 5 parts formulation. Use suitable liquid or slurry treating equipment. Formulated with 5-ethoxy-3-(trichloromethyl)-1,2,4-thiadiazole.
FKAGPES	Pythium		
FKAGRAM	Rhizoctonia		
FKAGTAK	Thielaviopsis		
/11003AA	Peppers		0.1 ppm (interim)
/11005AA	Tomatoes (bed grown)		0.1 ppm (interim)
FBBCSAS	Southern blight	7.5 lb/A (75% WP)	Soil application. Row treatment. Apply as dust or spray (use 100 gallon per acre for wettable powder) over open "V" trench prior to setting transplants. Set plants in bottom of trench then press walls of trench against stems of young transplants. Linear row feet per acre for the various systems is given as follows: 7,300 feet for non-staked tomatoes, 10,900 feet for staked tomatoes, 14,500 feet for peppers.
		2.25-3.75 lb/100 gal [transplants] (75% WP)	For transplant solution mix 2.25-3.75 pounds wettable powder in 100 gallons of water and apply 1/2 pint of mixture per plant at transplanting time to cover soil at base of plant.

	Site and Pest	Dosages and Formulation(s)	Tolerance, Use, Limitations
/14013AA	Potatoes (seed piece)		0.1 ppm (interim)
FKAGRAM	Rhizoctonia solani	10.0 lb/A (30% G) (75% WP) (2 lb/gal. or 23.8-24% EC)	Soil application. Row treatment. Apply dry in-furrow in a 12 to 15 inch band centered on row, and work product thoroughly into top 4 to 6 inches of soil (tuber-forming zone and soil that surrounds and covers seed piece). Apply liquid formulation at planting to tuber-forming zone. Use in sufficient water to total 20 gallons. Use 2 or 3 nozzles per row. It is desirable to treat when soil is slightly moist.
		18.0-25.0 lb/A (30% G) (75% WP) (2 lb/gal or 23.8-24% EC)	Soil application. Broadcast application. Apply dry or liquid formulation mixed with water to the soil surface prior to planting. Use 25 to 150 gallons per acre for wettable powder or emulsifiable concentrate formulations. Thoroughly mix (disc and cross-disc) in soil to a depth of 4 to 6 inches.
/24006AA	Rice (seed)		N.F.
FKAGRAM FKAGPES FKAGFAK FKAGTAK FKADQAB FKACQBB FKAFQBB	Rhizoctonia Pythium Fusarium Thielaviopsis Soilborne plant diseases Seedborne diseases Seedling diseases	0.07-0.14 lb/100 lb (1.8 lb/gal or 20% RTU) or 0.03-0.06 lb/bu (23.2% EC 23.1-23.2% RTU)	Seed treatment. Apply undiluted to seed or mix either 5 parts ready-to-use with 1 part water or one part flowable to 2 parts water and apply using suitable liquid or slurry treating equipment. Formulated with 5-ethoxy-3-trichloromethyl)-1,2,4-thiadiazole.

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	Site and Pest	Dosages and Formulation(s)	Tolerance, Use, Limitations
/27008AA	**Safflower** (seed)	N.F.	
FKANQBB	Seedling disease complex	0.025-0.075 lb/100 lb (20% D) (23.2% EC) 20-23.2% RTU) or 0.032-0.064 lb/bu (24.7% EC)	Seed treatment. Dry formulations may be applied after premixing (WP) with seed in planter box or mixing (WP) with sufficient water or mix 0.8 to 1.6 pounds in 1 gallon of water and apply through slurry treater calibrated to deliver recommended dosage. Liquid formulations may be applied undiluted to seed or add 1 part product to 2 parts water or add 5 parts product to 1 part water. Use suitable liquid or slurry treating equipment. May be formulated with 5-ethoxy-3-trichloromethyl)-1,2,4-thiadiazole.
FKACQBB	Seedborne disease		
FKAFQBB	Seedling diseases		
FKADQAB	Soilborne diseases		
FKAGFAK	Fusarium		
FKAGPES	Pythium		
FKAGRAM	Rhizoctonia		
FKAGTAK	Thielaviopsis		
/28019AA	**Sorghum** (seed)		N.F.
FICBABI	Aphanomyces	0.025-0.041 lb/100 lb (20%, D) (23.2% EC) (20-23.2% RTU) or 0.056 lb/bu (30% D)	Seed treatment. Apply liquid formulations undiluted to seed, or mix with sufficient water or mix 0.8 to 1.6 pounds per 1 gallon of water or mix 1 part ready-to use with 2 parts water or 5 parts (F1C) with 1 part water. Use suitable treating equipment such as liquid or slurry treater which has been calibrated to deliver recommended rates. Slight agitation may be required to mix the materials. May be formulated with p-(dimethylamino)benzenediazo sodium sulfonate and 5-ethoxy-3-trichloromethyl)-1,2,4-thiadiazole.
FLAEUAL	Covered kernel smut (Ustilago)		
FKAGRAM	Rhizoctonia		
FKAGPES	Pythium		
FKAGFAK	Fusarium		
FKAGTAK	Thielaviopsis		
FKANQBB	Seedling disease complex		
/28020AA	**Sugar Beets** (sees)	N.F.	
FKAGABI	Aphanomyas	0.075-0.19 lb/100 lb (20% D) (23.2% EC) 23.1% RTU)	Seed treatment. Apply in planter box. Formulated with 5-ethoxy-3-trichloromethyl)-1,2,4-thiadiazole.
FKAGFAF	Fusarium		
FKAGPES	Pythium		
FKAGRAM	Rhizoctonia		

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	Site and Pest	Dosages and Formulation(s)	Tolerance, Use, Limitations
/24007AA	Wheat (seed)		N.F.
FICBABI FKANQBB FLATTAQ	Aphanomyces Seedling disease complex Common smut (bunt)	0.025-0.047 lb/bu (20-30% D) (75% WP) 23.2- 24% EC) 23.1-25% RTU or 0.05- lb/100 lb (2.23 lb/gal or 24% EC) (17% FlC) (17.68-20% RTU)	Seed treatment. Apply dry product by premixing with 1 bushel seed directly in planter box or mix 0.8 to 1.6 pounds product per gallon water and apply through slurry treater or apply to seed after mixing product with sufficient water. Liquid formulations may be applied undiluted to seed or diluted by adding 1 part water to 1 to 2 parts product. Use suitable treating equipment such as slurry or mist seed treater. Or, liquid formulations may be applied undiluted to 100 pounds seed after mixing 5 parts product to 1 part water. Use suitable liquid or slurry treating equipment. May be formulated with lindane; captan; 5-ethoxy-3-trichloromethyl)-1,2,4-thiadiazole; xylene; or carboxin.

	Site and Pest	Dosages and Formulation(s)	Tolerance, Use, Limitations
	TERRESTRIAL NON-FOOD CROP		
	Ornamentals Plants and Forest Trees		
/31012AA	African Violet		
/31003AA	Bedding Plants		
/31034AA	Begonia		
/31057AA	Carnation		
/31065AA	Chrysanthemum		
/31159AA	Poinsettia		
/31184AA	Snapdragon		
FICBQBB	Stem rot	0.8-1.5 lb/1000 sq.ft (10% G) (75% WP) or 1.875 lb/300 gal/1000 sq.ft of bench or bed (75% WP) or 0.092 lb/gal in 30 gal/50 sq.ft (2.05 lb/gal or 24% EC)	Soil application. May be applied in dry form to soil surface and mixed thoroughly into top 2 inches of soil, or mixed with water and apply to well prepared seedbed. Also may be applied as soil drench after mixing with water. May be applied before planting to seedbed. May be formulated with captan.
FKAGRAM	Rhizoctonia		
FKAAQBB	Damping off		
/34022AA	Azalea		
FBADOAV	Ovulinia petal blight	0.75 lb/150 sq.ft (75% WP) (2 lb/gal or 23.8-24% EC)	Soil application. Apply as dust to ground beneath bushes and surrounding area beginning prior to opening of buds and repeat every 3 to 4 weeks through bloom period. Apply in sufficient water.
		0.0469 lb/sq.yd [of azalea bed] (75% WP)	Soil application. Begin 4 to 6 weeks before bloom and apply as a single spray to azalea beds, or apply as a dry mixture after blending with sand, sawdust or vermiculite.

	Site and Pest	Dosages and Formulation(s)	Tolerance, Use, Limitations
	Azalea (continued)		
		0.422-0.562 lb/100 gal (75% WP)	Foliar and soil applications. For blossom spray, use higher dosage and begin as first blossoms start to open. Use fine mist and apply lightly and thoroughly to all buds and open flowers, also spray ground surface beneath bushes until moist. Repeat at 4 to 5 day intervals or as new blossoms appear. Use lower dosage when new foliage appears and continue as in blossom spray. Avoid spraying interplanted species. Formulated with cycloheximide.
/34036AA	Camellia		
FBADSAQ	Camellia flower blight (Sclerotinia)	200.0 lb/A or 0.25-0.5 lb/100 sq.ft (75% WP) (23.8% EC)	Soil application. May be applied during early winter to soil surface or leaf litter beneath bushes. Continue applying at weekly or biweekly intervals prior to and during flowering season, especially following rains or damp weather. Or may be applied prior to opening of buds and repeated every 3 to 4 weeks through bloom period.
/31050AA	Calendula		
/31129AA	Larkspur		
/31184AA	Snapdragon		
/31197AA	Sweet Peas		
FICHSAQ	Stem rot (Sclerotinia)	100.0 lb/A or 0.2-0.25 lb/100 sq.ft (10% G) (75% WP) or 0.12 lb/25 gal/50 sq.ft (2.05 lb/gal or 24% EC)	Soil application. Product was developed for this use in Charleston, SC. May be applied as broadcast 1 week before planting. Spread dry product on soil surface and uniformly mixed in soil to depth of 4 inches (6 inches for 10 percent of dust). The emulsifiable concentrate formulation may be applied as a soil drench 1 week before planting. May be formulated with captan.

	Site and Pest	Dosages and Formulation(s)	Tolerance, Use, Limitations
/31111AA	**Gladiolus**		
FIBQSEA	Neck rot (Stromatinia/ Sclerotinia)	120.0 lb/A or 0.15 lb/100 sq.ft [broadcast] (10% G) or 2.75 lb/1000 sq.ft [broadcast] (75% WP) or 4.125 lb/1000 sq.ft row (75% WP)	Soil application. Broadcast or row treatment. Apply at planting time to soil surface and mix thoroughly in upper 4 to 6 inches of soil using suitable cultivation equipment. For row treatment, apply in a two inch band. Bulbs may be planted immediately.
FIAPSEA	Bulb rot (Stromatinia)		
FIAPSAQ	Bulb rot (Sclerotinia)		
/31123AA	**Hyacinth**		
/31044AA	**Iris (bulbous)**		
/31142AA	**Narcissus**		
/31025AA	**Tulips**		
FIAXQBB	Crown rot	100.0-200.0 lb/A or 0.2-0.4 lb/100 sq.ft [broadcast] (10% G) or 2.44-4.67 lb/1000 sq.ft [broadcast] (75% WP)	Soil application. For broadcast, apply dry to soil prior to planting and mix thoroughly in upper 6 to 7 inches of soil by double discing or rotovating. For bulbous iris (0.5 pounds per 100 square feet), spread product on soil surface and evenly distribute in soil to depth of 4 to 6 inches. Best results follow treatment in fall. For tulip beds, apply at planting time on heavily infested soils. Use digging fork or rototiller and work product into soil to depth of 6 to 10 inches. For row treatment apply to row at time bulbs are planted, dust sides and edges of open furrow and bulbs, then close furrow. Use high rate for black rot control and for heavier soils. Or bulbs may be dipped for 5 minutes in 7.5 percent concen-
FIBFQBB	Black rot		

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	Site and Pest	Dosages and Formulation(s)	Tolerance, Use, Limitations
	Hyacinth cluster (continued)		
		or 3.37-4.5 lb/1000 ft row (75% WP) or 2.25 lb/4.85 gal water [bulb dip] (75% WP)	tration (2.25 pounds per 4.85 gallons water) to which has been added 1 percent sticker. Maintain good agitation in dip tank. May be formulated with captan.
/31093AA	Lilies (Easter)		
FICBRAM	Rhizoctonia root rot	100.0-200.0 lb/A [broadcast] or 0.2-0.4 lb/100 sq.ft [broadcast] (10% G) or 2.44-4.875 lb/1000 sq.ft or [broadcast] (75% WP) or 3.375-4.875 lb/1000 ft row (75% WP) or 3.0-4.5 lb/100 gal [bulb dip] (75% WP)	Soil application. As broadcast, apply to soil surface prior to planting and mix thoroughly in upper 6 to 7 inches by double discing or rotovating. For furrow, apply at time bulbs are planted. Use lowerrates for light soils and higher rates for heavier soils. For bulb dip, suspend 3.0 to 4.5 pounds in 100 gallons of water and dip bulbs for 5 to 15 minutes. A sticker may be added to dip. Maintain good agitation in dip tank.

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	Site and Pest	Dosages and Formulation(s)	Tolerance, Use, Limitations
/31382AA	Iris (Dutch)		
FIAPSAS	Bulb rot (Sclerotium rolfsii)	100.0-150.0 lb/A or 0.2-0.4 lb/100 sq.ft [broadcast] (10% G) or 2.4-3.375 lb/1000 sq.ft [broadcast] (75% WP) or 6.0 lb/14,500 ft row [band] (10% G) 0.375 lb/1000 ft row (75% WP)	Soil application. As broadcast, apply granules or spray prior to planting. Mix with 2 to 3 inches of soil by discing and rototilling. May also be applied at planting time as a spray in 12 inch band centered on row. Repeat 3 times at 15 day interval.
FIAASAS	Stem rot (Sclerotium rolfsii)		
/31003CA /31003AA	Ornamental Flowering Plants		
34004AA /34004CA	Ornamental Woody Shrubs		
FICBPES	Root rot (Pythium)	0.05-0.075 oz/sq.ft of bench or bed area (5% G)	Soil application. Broadcast over bench or bed area and thoroughly work product into top 6 inches of soil. Or thoroughly mix soil and product in container. Formulated with p-(dimethylamino)-benzenediazo sodium sulfonate.
FICHPCN	Root rot (Phytophthora)		
FICHRAM	Root rot (Rhizoctonia)		
FICHPCN	Stem rot (Phytophthora)		
FICHPES	Stem rot (Pythium)		
FICHRAM	Stem rot (Rhizoctonia)		

	Site and Pest	Dosages and Formulation(s)	Tolerance, Use, Limitations
/35217AA	Pine (Southern) (seedlings)		
FDAFRAM	Rhizoctonia needle blight	37.5 lb/A (75% WP)	Soil application (in nursery beds). Apply in 100 gallons of water and use an additional 1/2 inch of water applied by irrigation. Seed may be planted immediately after irrigation or up to 1 week later.
/34120EA	Roses		
FICJBAW	Botrytis storage rot	-- (10% D) (20% D) or 0.75-1.5 lb/100 gal [dip/spray] (75% WP)	Storage treatment. May be applied by dusting bushes liberally immediately after stacking them root-to-root. As dip, mix 0.75 to 1.5 pounds per 100 gallons of water and dip dormant roses prior to storage. Maintain good agitation in dip tank. As spray, mix 1.5 pounds per 100 gallons of water and thoroughly spray dormant roses prior to storage.
/35216AA	Southern Magnolia		
FMBCPCE	Leaf spot (Phyllosticta)	1.5 lb/100 gal (75% WP)	Foliar application. Add a spreader-sticker at rate of 1 pint per 100 gallons of water. Apply at least 4 sprays at 2-week intervals to foliage beginning approximately 1 week prior to time disease is likely to occur. Do not use on Magnolia fuscata as injury may result.

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	Site and Pest	Dosages and Formulation(s)	Tolerance, Use, Limitations
	(Ornamental lawns and turf (including ground covers))		
/33006AA	Ornamental Lawns (warm season)		
/33015AA	Bahiagrass		
/33019AA	Bluegrass*		
/33023AA	Centipedegrass		
/33031AA	Fescue		
/33034AA	Kentucky Bluegrass		
/33043AA	Ryegrass (perennial)*		
/33050AA	St. Augustinegrass		
/33051AA	Tall fescue*		
FBAHRAM	Brown patch (Rhizoctonia)	0.496-0.916 lb/1,000 sq.ft (9.95-16.9% G)	Foliar application. Apply when foliage is dry. If temperature is 80 F or above, sprinkle to rinse granular off grass blades. To prevent dollar spot, leaf spot, rust and stripe smut on Kentucky bluegrass apply in fall and spring. To prevent snowmold apply prior to first snowfall. If dollar spot or rust become active during summer, apply at first indication of disease. As control for active disease, make a second application one month later. In South Florida apply in November and February as preventive for brown patch on bahiagrass, centipedegrass and St. Augustinegrass. A winter application may be needed if weather is favorable to disease development. Do not use product on: 1) bentgrass or zoysiagrass, or 2) mixed lawns of bluegrass and fine fescue where fescue is the desired variety, or 3) turf in California on other than bluegrass and then only from late fall through early spring. Also, do not use any other control product (such as weed control) for one week after applying.
FMAQSAQ	Dollar spot		
FMBCQAB	Leaf spot		
FJAAQBB	Rust		
FHAJTCB	Gray snowmold (Typhula)		
FHAJFAK	Pink snowmold (Fusarium)		

*Disease control for additional grasses claimed by certain formulations.

PENTACHLORONITROBENZENE

	Site and Pest	Dosages and Formulation(s)	Tolerance, Use, Limitations
/33006AA	Ornamental Lawns (warm season)		
/33015AA	Bahiagrass		
/33017AA	Bermudagrass		
/33023AA	Centipedegrass		
/33051AA	Tall fescue*		
/33050AA	St. Augustinegrass		
FBAHRAM	Brown patch (Rhizoctonia)	0.49-0.994 lb/1,000 sq.ft (13.57% G) (15.4% G)	Foliar application. Apply when foliage is dry. If temperature is 80 F or above, water lightly. Use drop spreader (preferred). Rotary spreader application should be made with extreme caution. As a preventive for brown patch control on bahiagrass, centipedegrass, and St. Augustinegrass apply higher rate in early fall (September and October); repeat in late winter or early spring; or, for control of active disease apply when symptoms are first noticed. Repeat in one month of disease persists. As a disease preventive on bermudagrass, apply lower rate to dry foliage in fall and early spring for leaf spot; also for dollar spot, apply in late spring/summer when disease is usually expected. Also as control for dollar spot, leaf spot and rust on bermudagrass, apply lower rate at first sign of disease. Repeat in 1 month if disease persists. For bermudagrass and tall fescue, as preventive or control for brown patch, apply lower rate during times of disease activity and when disease is expected. Repeat monthly as needed. Restrictions - do not use product on: 1) dichondra or stands of predominantly fine fescue, or 2) tall fescue during warm summer months in Southern United States, or 3) bermudagrass in Florida, Southern Alabama, Southern Mississippi, Louisiana, Southern Texas and California, or
FMAQSAQ	Dollar spot (Sclerotinia)		
FMBCQAB	Leaf spot		
FJAAQBB	Rust (Puccinia)		

	Site and Pest	Dosages and Formulation(s)	Tolerance, Use, Limitations
	Ornamental Lawns (warm season) cluster (continued)		
			4) Poa annua where turf is desired in Southern United States, or 5) winter overseeded bermudagrass putting greens. To prevent seedling damage do not allow excessive growth to occur in spring before first mowing. Product contains a fertilizer.
/33016AA	Bentgrass		
/33017AA	Bermudagrass		
/33050AA	St. Augustinegrass		
FBAHRAM	Brown patch (Rhizoctonia)	0.056-0.075 lb/25-35 gal/1000 sq.ft (75% WP)	Foliar application. For turf, add product to water, agitate suspension and apply as spray with band or power sprayer or hose-on proportioner. Use spray mixture the same day as it is prepared. Allow spray to dry on grass. Do not "water in" afterwards. Avoid mowing for 12 hours after applying. Avoid spraying during periods of high temperatures. For bentgrass, bermudagrass, and St. Augustinegrass, as a preventive apply lower rate in the spring before disease symptoms appear, then at 7 to 14 day intervals throughout the season when conditions favor disease development. As a curative apply higher dose when disease is already present or develops despite preventive spray. Repeat at 3 to 5 day interval until disease is controlled, then follow preventive schedule. Formulated with cycloheximide.
FMAQSAQ	Dollar spot		
FBATCFH	Fading out (Curvularia)		
FMAXPCR	Gray leaf spot (Piricularia)		
FMAYPES	Grease spot (turf) (Pythium)		
FMBCHAM	Leaf spot (Helminthosporium)		
FBATHAM	Melting out (Helminthosporium)		
FBAHRAM	Brown patch (Rhizoctonia)	0.035 lb/10 gal/1000 sq.ft (14% WP)	Foliar application. Special formulation for Florida turf. Apply as spray every 3 to 7 days as preventive when disease producting conditions are present. Formulated with thiram and captan.
FBATCFH	Fading out (Curvularia)		
FMAXPCR	Gray leaf spot (Piricularia)		

PENTACHLORONITROBENZENE

	Site and Pest	Dosages and Formulation(s)	Tolerance, Use, Limitations
/33005AA /33019AA /33043AA	Ornamental Lawns (cool season) Bluegrass Ryegrass (perennial)		
FLAUUAL	Stripe smut (Ustilago)	0.98-0.99 lb/1,000 sq.ft (13.57% G) (15.40% G)	Foliar application. Apply in fall and spring as preventive. For control apply when symptoms are first noticed. Repeat in 1 month for severe infections. In California, apply only on bluegrass turf in fall through early spring. Product contains a fertilizer.
/33005AA /33007AA /33007AA /33007AA /33019AA /33113AA /33049AA /33025AA	Ornamental Lawns (cool season) Ornamental Turf (golf fairways) Ornamental Turf (putting greens) Ornamental Turf (golf tees) Bluegrass Fescue (fine) Ryegrass (perennial) Bentgrass		
FHAJQBB	Snow mold	0.49-0.994 lb/1,000 sq.ft (13.57% G) (15.40% G)	Foliar application. Apply lower rate as preventive for snow mold prior to first heavy snowfall. Apply higher rate in areas where snow cover is present the entire winter. For putting greens and tees with bentgrass apply in mid-fall through early winter period. Product contains a fertilizer.
/33019AA /33113AA /33043AA	Bluegrass Fescue (fine leaf) Ryegrass (perennial)		
FMBCQBB FMAQSAQ FJAAPEJ	Leaf spot Dollar spot Rust (Puccinia)	0.49-0.499 lb/1,000 sq.ft (13.57% G) (15.40% G)	Foliar application. Apply lower rate for control when disease symptoms are first noticed. Repeat in 1 month if disease persists. Apply in fall and early spring to prevent leaf spot. Use appropriate spreader settings. For dollar spot apply when disease is usually expected. Apply higher rate for control at first sign of rust. Repeat in 1 month for severe infections. In California apply on bluegrass turf only. Product contains a fertilizer.

	Site and Pest	Dosages and Formulation(s)	Tolerance, Use, Limitations
/33005AA	Ornamental Lawns (cool season) (bluegrass)		
/33034AA	Kentucky bluegrass (Merion and Windsor varieties)		
FMBCHAM	Leaf spot (Helminthosporium)	0.985 lb/1,000 sq.ft (15.40% G)	Foliar application. Apply twice a year. In spring apply in March, April or May but at least before temperatures are consistently in 80's. In fall apply in September or October but at least before first heavy snow. If temperatures are 80 F or above, apply when grass blades are dry and water immediately to wash granules off grass blades. Product contains a fertilizer.
FLAUUAL	Stripe smut (Ustilago)		
FHAJTCB	Snow mold (Typhula)		
/33050AA	St. Augustinegrass		
FBAHRAM	Brown patch (Rhizoctonia)	0.98 lb/1,000 sq.ft (15.40% G)	Foliar application. Apply in late winter or early spring and again in early fall (September-October), or if extreme weather makes it necessary, treat after 1 month. Product contains a fertilizer.
/33005AA	Ornamental Lawns (cool season)		
/33034AA	Kentucky Bluegrass		
FHAJFAK	Snow mold (Fusarium)	0.98 lb/1,000 sq.ft (15.40% G)	Foliar application. Apply prior to first expected snow. Use appropriate spreader equipment. Product contains a fertilizer.
FLAUUAL	Stripe smut	0.98-0.96 lb/1,000 sq.ft (15.40% G)	Foliar application. Apply lower rate for control of all pests shown when symptoms are first noticed. Or, apply higher rate for control of heavily infested areas, or repeat lower rate in 1 month. Or, apply lower rate for control of stripe smut and leaf spot in spring and fall each year. Use appropriate spreader equipment. Product contains a fertilizer.
FMBCRAD	Leaf spot		
FJAAQBB	Rust		
FMAQSAQ	Dollar spot		

PENTACHLORONITROBENZENE

	Site and Pest	Dosages and Formulation(s)	Tolerance, Use, Limitations
/33019AA	Bluegrass		
/33031AA	Fescue		
/33043AA	Ryegrass		
FJAAQBB	Rust	0.025 lb/in 2.5-5 gal/1000 sq.ft (75% WP)	Foliar application. As preventive, apply in spring before disease symptoms appear then apply 7 to 14 day intervals throughout season. As eradicative, apply when disease is already present or develops despite preventive program. Repeat at 3 to 5 day intervals until disease is controlled then follow preventive schedule. Formulated with cycloheximide.
FFACQBB	Powdery mildew		
FBATCFH	Fading out (Curvularia)		
FBATHAM	Melting out (Helminthosporium)		
FMBCHAM	Leaf spot (Helminthosporium)		
FMAYPES	Grease spot (Pythium)		
/33008AA	Ornamental Turf		
/33010AA	Ornamental Lawns		
FHAJTCB	Snow mold (Typhula)	0.5-0.75 lb/1,000 sq.ft (10-12.5% G) or 0.375 lb/ 1,000 sq.ft (75% WP)	Foliar application. Apply prior to first snowfall using a granular lawn spreader or comparable equipment.
FHAJFAK	Snow mold (Fusarium)		
/33010AA	Ornamental Lawns		
FMBCHAM	Helminthosporium leaf spot	0.5-0.75 lb/1,000 sq.ft (10-12/5% G)	Foliar application. As a preventive, apply in spring or fall of each year. For control of existing infections, apply higher rate when symptoms are noted and lightly water treated area afterwards. Repeat 3 to 4 weeks later if treated area is subjected to unusually heavy rainfall, or flooded or if disease is severe or reappears.
/33017AA	Bermudagrass		
/FBBLLAS	Spring dead spot (Leptosphaeria)	1.0 lb/1,000 sq.ft (10% G)	Foliar application. For suppression of existing infection, apply in the spring or fall of each year. Water lightly following treatment. Formulated with 5-ethoxy-3-(trichloromethyl)-1,2,4-thiadiazole.

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	Site and Pest	Dosages and Formulation(s)	Tolerance, Use, Limitations
/33010AA	Ornamental Lawns		
/33008AA	Ornamental Turf		
/FKAVQBB	Damping-off (including seedling diseases	1.0 lb/1,000 sq.ft (10% G)	Foliar application. Apply to growing turf in the fall or spring at the first indication of infection. Water lightly. For areas to be seeded, apply prior to seeding. Mix in the top 1 or 2 inches of soil. If any treated area is subject ot unusually heavy rainfall, or flooded, or if the disease is several or reappears, repeat treatment 3 to 4 weeks later. Formulated with 5-ethoxy-3-(trichloromethyl)-1.2.4-thiadiazole.
/FKAVFAK	Fusarium		
/FKAVHAM	Helminthosporium		
/FKAVPED	Pythium		
/FKAVRAM	Rhizoctonia		
/33010AA	Ornamental Lawns		
/33050AA	St. Augustinegrass		
FBAHRAM	Brown patch (Rhizoctonia)	0.985 lb/1,000 sq.ft (15.40% G)	Foliar application. As preventive, apply 2 times per year (once in late winter or early spring and again in early fall, from September to October). Apply to dry foliage using appropriate spreader and settings. May be used on established lawns or at planting of new lawns. Sprinkle treated areas if temperature is 80 F or more.
/33005AA	Ornamental Lawns (cool season)		
/33010AA	Ornamental Turf (lawns)		
/33019AA	Bluegrass		
/33031AA	Fescue (fine)		
/33040AA	Ryegrass		
/33016AA	Bentgrass		
FBAHRAM	Brown patch (Rhizoctonia)	0.19-0.37 lb/1,000 sq.ft (4.67% G) (10-12.5% G)	Foliar application. Apply before disease is expected to appear and at first sign of disease and water treated area afterwards. Repeat every 7 to 10 days during hot, damp

	Site and Pest	Dosages and Formulation(s)	Tolerance, Use, Limitations
	Ornamental Lawns (cool season) (continued)		
		or 0.14-0.187 lb 3-6 gal/1000 sq.ft (75% WP) (2.05 lb/gal or 24% EC)	weather or apply as a spray (prepared by adding product to water). Or, for 4.67 percent granular formulation, apply at time disease normally appears using appropriate spreader settings and equipment and water in lightly; repeat in 6 weeks if disease conditions aresevere or reappear. Labeling of 4.67 percent granular formulation also claims as cool season grasses: bentgrass, creeping red fescue, Kentucky bluegrass, Merion bluegrass, redtop and ryegrass. Product contains a fertilizer.
/33010AA	Ornamental Lawns (warm season)		
/33017AA	Bermudagrass		
/33050AA	St. Augustinegrass		
FBAHRAM	Brown patch (Fusarium)	0.5-0.8 lb/1,000 sq.ft (2% G) (2.25% G) (10-12.5% G) (75% WP) (2 lb/gal or 23.8-24% EC) (2.016-2.05 lb/gal or 24% EC) or 0.37 lb/1,000 sq.ft (4.67% G)	Foliar application. Apply in fall or spring at first brown patch symptoms and moderately water treated area. Repeat 3 to 4 weeks later if treated area is subjected to heavy rainfall or is flooded or if disease is severe or reappears. Or, for 4.67 percent granular formulation apply once at time disease normally appears using appropriate settings and equipment and water it lightly. Repeat in 6 weeks if disease conditions are se vere and reappear. Labeling of 4.67 percent granular formulation claims as Southern grasses: bahiagrass, centipedegrass, common bermudagrass, Kentucky 31 fescue, Maryland bentgrass, ryegrass, Texas turf 10, Tifgreen, Tifine, Tifway and Snyder bermudagrass, Seaside bentgrass, St.Augustinegrass and zoysiagrass. Addeither 10 to 15 gallons or 15 to 20 gallons of water to emulsifiable concentrate formulation and apply. Product may contain a fertilizer. May be formulated with carbaryl.

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	Site and Pest	Dosages and Formulation(s)	Tolerance, Use, Limitations
/33028AA	Dichondra		
FBAHRAM	Brown patch (Rhizoctonia)	0.75 lb/1,000 sq.ft (4.57-12.5% G) or 0.75-0.768 lb/40 gal/1000 sq.ft (75% WP) (2 lb/gal or 23.9-24% EC) (2.05 lb/gal or 24% EC) or 0.75 lb/10-15 gal/1000 sq.ft (2 lb/gal or 24% EC)	Foliar application. Apply in fall or spring (as in warm season cluster) at first sign of disease and water treated area lightly after treating. Repeat 3 to 4 weeks later.

Listing of Registered Pesticide Products by Formulation

6094.0001 94% technical chemical
pentachloronitrobenzene (056502)
000524-00122*
*currently unavailable for review

6095.0001 95% technical chemical
pentachloronitrobenzene (056502)
005481-00197

6096.0001 96% technical chemical
pentachloronitrobenzene (056502)
000400-00401

6097.0001 97% technical chemical
pentachloronitrobenzene (056502)
002749-00009

6080.0002 80% formulation intermediate
pentachloronitrobenzene (056502)
007501-00045

6090.0002 90% formulation intermediate
pentachloronitrobenzene (056502)
000400-00414

6010.0003 10% dust
pentachloronitrobenzene (056502) plus p-(dimethylamino)benzenediazo sodium sulfonate (034201)
003125-00145

pentachloronitrobenzene (056502) plus thiram (079801)
002342-00786 003743-00303

pentachloronitrobenzene (056502) plus captan (081301)
000239-02382*
*currently unavailable for review

pentachloronitrobenzene (056502) plus 5-ethoxy-3-(trichloromethyl)-1,2,4-thiadiazole (084701)
007501-00047 007501-00052

pentachloronitrobenzene (056502), maneb (014505), captan (081301) plus 5-ethoxy-3-(trichloromethyl)-1,2,4-thiadiazole (084701)
050200-00002

6020.0003 20% dust
pentachloronitrobenzene (056502) plus 5-ethoxy-3-(trichloromethyl)-1,2,4-thiadiazole (084701)
007501-00048 007501-00051 007501-00054

Listing of Registered Pesticide Products by Formulation (continued)

6025.0003 25% dust
pentachloronitrobenzene (056502)
034704-00044

6030.0003 30% dust
pentachloronitrobenzene (056502) plus thiram (079801)
000743-00300

pentachloronitrobenzene (056502) plus captan (081301)
000476-01977 002749-00289 010107-00081

6040.0003 40% dust
pentachloronitrobenzene (056502)
000279-01250

6002.0004 2% granular
pentachloronitrobenzene (056502)
000557-01856

6002.2504 2.25% granular
pentachloronitrobenzene (056502)
007001-00332

6002.5004 2.5% granular
pentachloronitrobenzene (056502) plus carbaryl (056801)
011489-00001

6003.7504 3.75% granular
pentachloronitrobenzene (056502)
004185-00229

6004.6704 4.67% granular
pentachloronitrobenzene (056502)
007401-00197 007401-00389

6005.0004 5% granular
pentachloronitrobenzene (056502) plus p-(dimethylamino)benzenediazo sodium sulfonate (034201)
003125-00109

6006.5004 6.5% granular
pentachloronitrobenzene (056502) plus O,O-diethyl S-[2-(ethylthio)-ethyl] phosphorodithioate (032501)
000400-00411* 001202-00203# 001526-00411 002935-00362
008434-00033 010226-00014*
#suspended
*currently unavailable for review

6.5% granular (continued)

pentachloronitrobenzene (056502) plus phorate (057201)
000279-02938 000400-00412 001526-00492* 002935-00361
011656-00029
*currently unavailable for review

pentachloronitrobenzene (056502), O,O-diethyl S-[2-(ethylthio)ethyl] phosphorodithioate (032501) plus 5-ethoxy-3-(trichloromethyl)-1,2,4-thiadiazole (084701)
000400-00408*
*currently unavailable for review

pentachloronitrobenzene (056502), phorate (057201) plus 5-ethoxy-3-(trichloromethyl)-1,2,4-thiadiazole (084701)
000241-00187 000279-02591 000400-00409

6009.9504 9.95% granular
pentachloronitrobenzene (056502)
000538-00116

6010.0004 10% granular
pentachloronitrobenzene (056502)
000400-00402 000400-00407 000476-01739 001202-00193
001526-00439 002935-00357 010404-00038

pentachloronitrobenzene (056502) plus captan (081301)
000476-01881

pentachloronitrobenzene (056502) plus 5-ethoxy-3-(trichloromethyl)-1,2,4-thiadiazole (084701)
000400-00406

pentachloronitrobenzene (056502), phorate (057201) plus 5-ethoxy-3-(trichloromethyl)-1,2,4-thiadiazole (084701)
000241-00146

pentachloronitrobenzene (056502), 5-ethoxy-3-(trichloromethyl)-1,2,4-thiadiazole (084701) plus aldicarb (098301)
000264-00319

6012.5004 12.5% granular
pentachloronitrobenzene (056502)
010404-00037

6013.5704 13.57% granular
pentachloronitrobenzene (056502)
000538-00170

PENTACHLORONITROBENZENE

Listing of Registered Pesticide Products by Formulation (continued)

6015.4004 15.4% granular
pentachloronitrobenzene (056502)
000538-00040 000538-00050 000538-00055 000538-00108

6016.9004 16.9% granular
pentachloronitrobenzene (056502)
000538-00078 000538-00096

6030.0004 30% granular
pentachloronitrobenzene (056502)
000400-00415

6014.0006 14% wettable powder
pentachloronitrobenzene (056502), thiram (079801) plus captan (081301)
006720-00075

6030.0006 30% wettable powder
pentachloronitrobenzene (056502) plus captan (081301)
000476-01928

6035.0006 35% wettable powder
pentachloronitrobenzene (056502) plus p-(dimethylamino)benzenediazo sodium sulfonate (034201)
005967-00055 003125-00070

6075.0006 75% wettable powder
pentachloronitrobenzene (056502)
000400-00399 003743-00251

pentachloronitrobenzene (056502) plus cycloheximide (043401)
045639-00103*
*currently unavailable for review

6212.5012 12.5% (1.056 lb/gal) emulsifiable concentrate
pentachloronitrobenzene (056502) plus malathion (057701)
007401-00163

6222.9012 22.9% (2 lb/gal) emulsifiable concentrate
pentachloronitrobenzene (056502) plus 5-ethoxy-3-(trichloromethyl)-1,2,4-thiadiazole (084701)
007501-00046

6223.2012 23.2% (2 lb/gal) emulsifiable concentrate
pentachloronitrobenzene (056502) plus 5-ethoxy-3-(trichloromethyl)-1,2,4-thiadiazole (084701)
007501-00049 043789-00095

6223.4012 23.4% (2 lb/gal) emulsifiable concentrate
pentachloronitrobenzene (056502)
001339-00187

Listing of Registered Pesticide Products by Formulation (continued)

6223.8012 23.8% (2 lb/gal) emulsifiable concentrate
pentachloronitrobenzene (056502)
000400-00400

6223.9012 23.9% emulsifiable concentrate
pentachloronitrobenzene (056502)
010370-00070*
*currently unavailable for review

6224.0012 24% (2 lb/gal) emulsifiable concentrate
pentachloronitrobenzene (056502)
000400-00403 000400-00404 000550-00091 000554-00110
000557-01936 000728-00081 002935-00208 002935-00419
007001-00175 007401-00042 007501-00050 007501-00053
010820-00004 043789-00097 046946-00170

pentachloronitrobenzene (056502) plus xylene (086802)
043789-00096

6224.0012 24% (2.05 lb/gal) emulsifiable concentrate
pentachloronitrobenzene (056502)
007401-00084

6224.7012 24.7% (2.055 lb/gal) emulsifiable concentrate
pentachloronitrobenzene (056502)
010820-00007

6226.4912 26.49% (2 lb/gal) emulsifiable concentrate
pentachloronitrobenzene (056502)
010226-00032

6217.0014 17% (1.66 lb/gal) flowable concentrate
pentachloronitrobenzene (056502) plus carboxin (090201)
007501-00087

6210.0016 10% (0.88 lb/gal) liquid-ready to use
pentachloronitrobenzene (056502) plus 5-ethoxy-3-(trichloromethyl)-1,2,4-thiadiazole (084701)
007501-00058

6217.6816 17.68% (1.68 lb/gal) liquid-ready to use
pentachloronitrobenzene (056502) plus lindane (gamma isomer of benzene hexachloride (009001)
007501-00078

6220.0016 20% (1.72 lb/gal) liquid-ready to use
pentachloronitrobenzene (056502)
007501-00061

Listing of Registered Pesticide Products by Formulation (continued)

6220.0016 20% (1.80 lb/gal) liquid-ready to use
pentachloronitrobenzene (056502) plus 5-ethoxy-3-(trichloromethyl)-
1,2,4-thiadiazole (084701)
007501-00059

6220.0016 20% (1.89 lb/gal) liquid-ready to use
pentachloronitrobenzene (056502) plus 5-ethoxy-3-(trichloromethyl)-
1,2,4-thiadiazole (084701)
007501-00060

6222.6016 22.6% (2 lb/gal) liquid-ready to use
pentachloronitrobenzene (056502) plus 5-ethoxy-3-(trichloromethyl)-
1,2,4-thiadiazole (084701)
007501-00056

6223.1016 23.1% (2 lb/gal) liquid-ready to use
pentachloronitrobenzene (056502) plus 5-ethoxy-3-(trichloromethyl)-
1,2,4-thiadiazole (084701)
007501-00057

6223.2016 23.2% (2 lb/gal) liquid-ready to use
pentachloronitrobenzene (056502) plus 5-ethoxy-3-(trichloromethyl)-
1,2,4-thiadiazole (084701)
000400-00405

6223.7016 23.7% (2 lb/gal) liquid-ready to use
pentachloronitrobenzene (056502)
007501-00055

6224.0016 24% (2.23 lb/gal) liquid-ready to use
pentachloronitrobenzene (056502)
007501-00070

6225.0016 25% (2 lb/gal) liquid-ready to use
pentachloronitrobenzene (056502)
010912-00024

Listing of Registered Pesticide Products by Formulation (continued)

9999999 State Label Registrations

AL Reg. No.
000359-08633 001258-08639

AZ Reg. No.
001202-05009 001526-03787

CA Reg. No.
000239-08631 000909-08642 001202-05033 001202-05034
001202-05035 001202-05061 005967-08641 008278-10167
008434-07052 008434-07053 008434-07054 008434-08976
010972-06550 010972-10158 010972-10159 011017-08196
011093-07371 011656-05918 011656-07055

FL Reg. No.
000557-06962 000829-09450 003122-07192 003122-07565
006720-03357 007478-08028 009859-10165 009859-10166
021275-05364

GA Reg. No.
000359-08632 001258-08638 007413-010284

ID Reg No.
010258-08637

OK Reg. No.
001258-08634 001258-08635 001258-08640

OR Reg. No.
001871-08921

TX Reg. No.
001258-08636 035994-06087 037854-08298

EPA Index to Pesticide Chemicals

PENTACHLORONITROBENZENE

Appendix A-1

Listing of the Active Ingredient(s) Found in Combination With the Report Chemical.

Chemical Code	Common Name (source)	EPA Acceptable Common/Chemical Name
098301	--	aldicarb
081301	--	captan
090201	--	carboxin
043401	cycloheximide	cycloheximide 3-[2-(3,5-dimethyl-2-oxocyclohexyl)-2-hydroxyethyl]glutarimide
032501	disulfoton (ISO)	o,o-diethyl s-[2-(ethylthio)ethyl] phosphorodiathioate
057201	phorate (ANSI)	o,o-diethyl s-[(ethylthio)methyl] phosphorodithioate
034201	fenaminosulf (ISO)	p-(dimethylamino)benzenediazo sodium sulfonate
084701	--	5-ethoxy-3-(trichloromethyl)-1,2,4-thiodiazole
009001	lindane	lindane
057701	--	malathion
014505	--	maneb
079801	--	thiram
086802	--	xylene

-- Use EPA Acceptable Common/Chemical Name

IV. BIBLIOGRAPHY APPENDICES

Guide to Bibliography

Bibliography

GUIDE TO USE OF THIS BIBLIOGRAPHY

PCNB

1. CONTENT OF BIBLIOGRAPHY. This bibliography contains citations of all studies considered relevant by EPA in arriving at the positions and conclusions stated elsewhere in the Standard. Primary sources for studies in this bibliography have been the body of data submitted to EPA and its predecessor agencies in support of past regulatory decisions. Selections from other sources including the published literature, in those instances where they have been considered, will be included.

2. UNITS OF ENTRY. The unit of entry in this bibliography is called a "study." In the case of published materials, this corresponds closely to an article. In the case of unpublished materials submitted to the Agency, the Agency has sought to identify documents at a level parallel to the published article from within the typically larger volumes in which they were submitted. The resulting "studies" generally have a distinct title (or at least a single subject), can stand alone for purposes of review, and can be described with a conventional bibliographic citation. The Agency has attempted also to unite basic documents and commentaries upon them, treating them as a single study.

3. IDENTIFICATION OF ENTRIES. The entries in this bibliography are sorted numerically by "Master Record Identifier," or MRID, number. This number is unique to the citation, and should be used at any time specific reference is required. It is not related to the six-digit "Accession Number" which has been used to identify volumes of submitted studies; see paragraph 4(d)(4) below for a further explanation. In a few cases, entries added to the bibliography late in the review may be preceded by a nine-character temporary identifier. These entries are listed after all MRID entries. This temporary identifier number is also to be used whenever specific reference is needed.

4. FORM OF ENTRY. In addition to the Master Record Identifier (MRID), each entry consists of a citation containing standard elements followed, in the case of material submitted to EPA, by a description of the earliest known submission. Bibliographic conventions used reflect the standards of the American National Standards Institute (ANSI), expanded to provide for certain special needs.

a. Author. Whenever the Agency could confidently identify one, the Agency has chosen to show a personal author. When no individual was identified, the Agency has shown an identifiable laboratory or testing facility as author. As a last resort, the Agency has shown the first submitter as author.

b. Document Date. When the date appears as four digits with no question marks, the Agency took it directly from the document. When a four-digit date is followed by a question mark, the bibliographer deduced the date from evidence in the document. When the date appears as (19??), the Agency was unable to determine or estimate the date of the document.

c. Title. In some cases, it has been necessary for Agency bibliographers to create or enhance a document title. Any such editorial insertions are contained between square brackets.

d. Trailing Parentheses. For studies submitted to the Agency in the past, the trailing parentheses include (in addition to any self-explanatory text) the following elements describing the earliest known submission:

   (1) Submission Date. The date of the earliest known submission appears immediately following the word "received."

   (2) Administrative Number. The next element, immediately following the word "under," is the registration number, experimental use permit number, petition number, or other administrative number associated with the earliest known submission.

   (3) Submitter. The third element is the submitter, following the phrase "submitted by." When authorship is defaulted to the submitter, this element is omitted.

   (4) Volume Identification (Accession Numbers). The final element in the trailing parentheses identifies the EPA accession number of the volume in which the original submission of the study appears. The six-digit accession number follows the symbol "CDL," standing for "Company Data Library." This accession number is in turn followed by an alphabetic suffix which shows the relative position of the study within the volume. For example, within accession number 123456, the first study would be 123456-A; the second, 123456-B; the 26th, 123456-Z; and the 27th, 123456-AA.

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00001555	Larson, P.S.; Borzelleca, J.F. (1967) Acute Oral Toxicities and Potentiation Studies of Terraclor and Terrazole in Male Albino Rats. (Unpublished study received Nov 30, 1967 under 1258-Q; prepared by Medical College of Virginia, Dept. of Pharmacology, submitted by Olin Mathieson Chemical Corp., Stamford, Conn.; CDL:110044-A)
00001570	Griffith, W.P. (1973) Determination of Terrazole (5-Ethoxy-3-Trichloromethyl-1,2,4-Thiadiazole) and Terraclor (Pentachloronitrobenzene) and Allied Metabolites in Plant Tissues or Harvest Samples. Method CAM-24-73 dated Jul 3, 1973. (Unpublished study received Feb 4, 1977 under 1258-812; submitted by Olin Corp., Agricultural Div., Little Rock, Ark.; CDL:095799-M)
00001665	Finnegan, J.K.; Larson, P.S.; Smith, R.B., Jr.; Haag, H.B.; Hennigar, G.R. (1958) Acute and chronic toxicity studies on pentachloronitrobenzene. Archives Internationales de Pharmacodynamie et de Therapie CXIV(1):38-52. (Also in unpublished submission received Jan 26, 1969 under 9F0754; submitted by Olin Mathieson Chemical Corp., New York, N.Y.; CDL:091301-A)
00001666	Larson, P.S.; Borzelleca, J.F. (1968) Three Generation Reproduction Study on Rats Receiving Terraclor in Their Diet. (Unpublished study including letter dated May 15, 1968 from G.R. Hennigar to Paul Larson, received Jan. 26, 1969 under 9F0754; prepared by Medical College of Virginia, Dept. of Pharmacology, Submitted by Olin Mathieson Chemical Corp., New York, N.Y.; CDL:091301-B)
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00001669	Ackermann, H.J.; Baltrush, H.A.; Berges, H.H.; Brookover, D.O.; Brown, B.B. (1958) Spectrophotometric determination of pentachloronitrobenzene on food and forage crops: Fungicide residues. Agricultural and Food Chemistry 6(10):747-750. (Also in unpublished submission received Jan 26, 1969 under 9F0754; submitted by Olin Mathieson Chemical Corp., New York, N.Y. CDL:091301-I)

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00001678	Betts, J.J.; James, S.P.; Thorpe, W.V. (1955) The metabolism of pentachloronitrobenzene and 2:3:4:6-tetrochloronitrobenzene and the formation of mercapturic acids in the rabbit. Biochemical Journal 61(?):611-617. (Also in unpublished submission received Jan 26, 1969 under 9F0754; submitted by Olin Matnieson Chemical Corp., New York, N.Y.; CDL:091301-S)
00001679	Lambe, R.C. (1973) Pyracantha (Pyracantha leylandii) Scab: Fusicaldium pyracanthae. (Unpublished study including letter dated Jul 3, 1973 from R.C. Lambe to W.A. Small, received Oct 1, 1973 under 372-EX-9; prepared by Virginia Polytechnic Institute and State Univ., Dept. of Plant Pathology and Physiology, submitted by Mallinckrodt Chemical Works, St. Louis, Mo.; CDL:123407-A)
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00001707	Kuchar, E.J. (1969) Residues of Terraclor (Pentachloronitrobenzene-PCNB) in Alfalfa: CASR-7-69. (Unpublished study that includes Method CAM-14-69 dated Nov 25, 1969 entitled: Determination of Pentachloronitrobenzene (PCNB, Olin 5275) in Alfalfa: Analytical Method, received Mar 24, 1970 under 9F0754; submitted by Olin Mathieson Chemical Corp., New Haven, Conn.; CDL:091299-C)
00001859	Kuchar, E.J. (1973) Miscellaneous Analytical Investigations Concerned with Terraclor: CASR-3-73. (Unpublished study received Jul 31, 1972 under 1F1083; submitted by Olin Corp., Stamford, Conn.; CDL:090841-I)
00001861	Kuchar, E.J. (1973) Residues of Terraclor, Impurities and Metabolites in Various Crops (1969-1972): CASR-2-73. (Unpublished study that includes method CAM-12-70 dated Apr 28, 1970, received Jul 31, 1972 under 1F1083; submitted by Olin Corp., Stamford, Conn.; CDL:090841-K)

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00014326	Kuchar, E.J.; Griffith, W.P.; Thomas, R.J. (1969) Analytical Investigations Concerned with Terraclor--Terrazole Cow Feeding Studies: CASR-4-69. (Unpublished study received on unknown date under 0F0997; submitted by Olin Corp., Stamford, Conn.; CDL: 098490-K)
00014327	Griffith, W.P. (1969) Determination of 5-Ethoxy-3-trichloromethyl-1,2,4-thiadiazole (Olin 52424) and Pentachloronitrobenzene (PCNB, Olin 5275) and Allied Metabolites in Cow's Milk. Method CAM-1-69 dated Feb 1, 1969. (Unpublished study received on unknown date under 0F0997; submitted by Olin Corp., Stamford, Conn.; CDL:098490-L)
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00053075	Chemagro Corporation (1960) Synopsis of Pentachloronitrobenzene (PCNB) Analytical and Residue Data (Sugar Beets). (Unpublished study received Apr 4, 1960 under unknown admin. no.; prepared in cooperation with Olin Mathieson Chemical Corp.; CDL:119239-A)
00059120	Thomas, M.P. (1965) Letter sent to S.I. Cohen dated Jun 11, 1965: Storage stability of Olin-2424 and Terraclor in cottonseed. (Unpublished study received May 28, 1970 under 0F0997; submitted by Olin Chemicals, Consumer Products, Div. of Olin Corp., Stamford, Conn.; CDL:091717-AF)
00059146	Kuchar, E.J. (1968) Letter sent to H.H. Klein dated Feb 2, 1968: Residues--seed treatment samples. (Unpublished study received Feb 16, 1968 under 1258-818; submitted by Olin Corp., Stamford, Conn.; CDL:101585-K)
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00059932	Kuchar, E.J. (1970) Letter sent to H.H. Klein dated Oct 14, 1970: Terraclor experiments--peanut related material. (Unpublished study received Jul 31, 1972 under 1F1083; submitted by Olin Chemicals, Consumer Products, Div. of Olin Corp., Stamford, Conn.; CDL:090841-F)
00059933	Kuchar, E.J. (1973) Letter sent to R.F. Philpitt dated Jan 23, 1973: Terraclor residues--Idaho potatoes. (Unpublished study received Feb 5, 1973 under 1F1083; submitted by Olin Chemicals, Consumer Products, Div. of Olin Corp., Stamford, Conn.; CDL: 090841-G)

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00097715	Olin Corporation (1965) Terraclor Residue Data on Celery and Lettuce. (Compilation; unpublished study received Jun 28, 1965 under 1258-185; CDL:024655-A)
00097719	Thomas, M.P.; Geenty, F.O.; Griffith, W.P. (1964) Terraclor Residues in 1964 Potatoes from 2-lb. EC Treatment: CASR-31-64. (Unpublished study received Dec 16, 1964 under 1258-279; submitted by Olin Corp., Stamford, Conn.; CDL:024735-B)
00097720	Baltrush, H.A. (1956) Method of Analysis of Terraclor in Cabbage. (Unpublished study received Feb 23, 1956 under 1258-279; submitted by Olin Corp., Stamford, Conn.; CDL:024737-A)
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00097740	Olin Corporation (1964) Residue Studies of Terraclor on Cotton. (Compilation; unpublished study, including report nos. ACD-19-56 and CASR-18-64, received Jan 26, 1969 under 9F0754; CDL: 091300-K)
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00097743	Ackermann, H.J.; Brookover, D.O.; McTurck, M.A. (1956) Analysis for Terraclor in Tomatoes: Report No. ACD-31-56. (Unpublished study received Jan 26, 1969 under 9F0754; submitted by Olin Corp., Stamford, Conn.; CDL:091300-N)
00097749	Olin Corporation (1961) Introduction: White Banana Paste 9362. (Unpublished study received May 27, 1968 under 9F0754; CDL: 093066-A)
00097751	Kuchar, E.J.; Griffith, W.P.; (1968) Analytical Studies of the Metabolism of Terraclor in Beagle Dogs and Rats: CASR-9-68. (Unpublished study received Sep 25, 1968 under 9F0754; submitted by Olin Corp., Stamford, Conn.; CDL:097472-A)

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00114168	Iacoviello, S. (1978) Chemodynamic Parameter of Terraclor (Pentachloronitrobenzene) Soil Adsorption: 1414. (Unpublished study received Sep 7, 1982 under 1258-517; submitted by Olin Corp., Stamford, CT; CDL:248281-A)
00114181	Esposito, A.; DeFelice, D.; Kuchar, E.; et al. (1977) Laboratory Soil Leaching Studies Concerned with Terraclor (Pentachlornitrobenzene): 3450. (Unpublished study received Sep 7, 1982 under 1258-517; submitted by Olin Corp., Stamford, CT; CDL: 248281-P)
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00114185	Lamoureux, G.; Rusness, D. (1980?) In vitro Metabolism of Pentachloronitrobenzene to Pentachloromethylthiobenzene by Onion: Characterization of Gluthione S-Transferase, Cysteine C-S Lyase, and S-Adenosylmethionine Methyl Transferase Activities: Olin 3549. (U.S. Dept. of Agriculture, Science and Education Administration, Agricultural Research, Metabolism and Radiation Research Laboratory; unpublished study; CDL:248282-D)
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00114206	Ercegovich, C.; Rashid, K. (1977) Mutagenesis Induced in Mutant Strains of Salmonella Typhimurium by Pesticides: Submitter 3517. (Unpublished paper presented at 174th American Chemical Society National Meeting, Div. of Pesticide Chemistry; Aug 30, 1977; unpublished study received Sep 7, 1982 under 1258-517; prepared by Pennsylvania State Univ., Pesticide Research Laboratory, submitted by Olin Corp., Stamford, CT; CDL:248283-P)
00114207	Dupre, G.; O'Grodnick, J. (1978) Absorption and Elimination Characteristics of 14C-labeled Pentachloronitrobenzene in Rats--Pilot Study: Report No. 77037; 3528. (Unpublished study received Sep 7, 1982 under 1258-517; prepared by Bio/dynamics, Inc., submitted by Olin Corp., Stamford, CT; CDL:248284-A)
00114208	Dupre, G.; O'Grodnick, J. (1978) Characterization and Identification of 14C-PCNB Metabolites in Rat Urine and Feces: Report No. 77037-2; 3528. (Unpublished study received Sep 7, 1982 under 1258-517; prepared by Bio/dynamics, Inc., submitted by Olin Corp., Stamford, CT; CDL:248284-B)
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00114226	Weisburger, J.; Weisburger, E.; Powers, M.; et al. (19??) Bioassay of pentachloronitrobenzene for possible carcinogenicity. By U.S. National Institutes of Health, National Cancer Institute, Division of Cancer Cause and Prevention, Carcinogenesis Testing Program; Hazleton Laboratories America, Inc. and Tracor Jitco, Inc. S.l.:USNIH. (DHEW Publication No. (NIH) 78-1311; Olin 3575; published study; CDL:248285-L)
00114232	Scholz; Brunk (1968) Chronic Oral Toxicity of Pentachloronitrobenzene: Two-year Study with Dogs: Submitter 3587. (Unpublished study received Sep 7, 1982 under 1258-517; prepared by Farbwerke Hoechst AG, W. Ger., submitted by Olin Corp., Stamford, CT; CDL: 248286-B)
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00114250	Courtney, K.; Copeland, M.; Robbins, A. (1976) The effects of pentachloronitrobenzene, hexachlorobenzene, and related compounds on fetal development. Toxicology and Applied Pharmacology 35: 239-256. (Also in unpublished submission received Sep 7, 1982 under 1258-517; submitted by Olin Corp., Stamford, CT; CDL: 248286-U)
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APPENDIX V

FORMS APPENDICES

OMB Approval No. 2000-0468

FIFRA SECTION 3(C)(2)(B) SUMMARY SHEET	EPA REGISTRATION NO.
PRODUCT NAME	
APPLICANT'S NAME	DATE GUIDANCE DOCUMENT ISSUED

With respect to the requirement to submit "generic" data imposed by the FIFRA section 3(C)(2)(B) notice contained in the referenced Guidance Document, I am responding in the following manner:

☐ 1. I will submit data in a timely manner to satisfy the following requirements. If the test procedures I will use deviate from (or are not specified in) the Registration Guidelines or the Protocols contained in the Reports of Expert Groups to the Chemicals Group, OECD Chemicals Testing Programme, I enclose the protocols that I will use:

☐ 2. I have entered into an agreement with one or more other registrants under FIFRA section 3(C)(2)(B)(ii) to satisfy the following data requirements. The tests, and any required protocols, will be submitted to EPA by:

NAME OF OTHER REGISTRANT

☐ 3. I enclose a completed "Certification of Attempt to Enter Into an Agreement with Other Registrants for Development of Data" with respect to the following data requirements:

☐ 4. I request that you amend my registration by deleting the following uses (this option is not available to applicants for new products):

☐ 5. I request voluntary cancellation of the registration of this product. (This option is not available to applicants for new products.)

REGISTRANT'S AUTHORIZED REPRESENTATIVE	SIGNATURE	DATE

EPA Form 8580-1 (10-82)

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OMB Approval No. 2000-0468

CERTIFICATION OF ATTEMPT TO ENTER INTO AN AGREEMENT WITH OTHER REGISTRANTS FOR DEVELOPMENT OF DATA

(To qualify, certify ALL four items)

1. I am duly authorized to represent the following firm(s) who are subject to the requirements of a Notice under FIFRA Section 3(c)(2)(B) contained in a Guidance Document to submit data concerning the active ingredient:

GUIDANCE DOCUMENT DATE

ACTIVE INGREDIENT

NAME OF FIRM	EPA COMPANY NUMBER

(This firm or group of firms is referred to below as "my firm".)

2. My firm is willing to develop and submit the data as required by that Notice, if necessary. However, my firm would prefer to enter into an agreement with one or more other registrants to develop jointly, or to share in the cost of developing, the following required items or data.

3. My firm has offered in writing to enter into such an agreement. Copies of the offers are attached. That offer was irrevocable and included an offer to be bound by an arbitration decision under FIFRA Section 3(c)(2)(B)(iii) if final agreement on all terms could not be reached otherwise. This offer was made to the following firm(s) on the following date(s):

NAME OF FIRM	DATE OF OFFER

However, none of those firm(s) accepted my offer.

4. My firm requests that EPA not suspend the registration(s) of my firm's product(s), if any of the firms named in paragraph (3) above have agreed to submit the data listed in paragraph (2) above in accordance with the Notice. I understand EPA will promptly inform me whether my firm must submit data to avoid suspension of its registration(s) under FIFRA Section 3(c)(2)(B). (This statement does not apply to applicants for new products.) I give EPA permission to disclose this statement upon request.

TYPED NAME	SIGNATURE	DATE

EPA Form 8580-6 (10-82)

PRODUCT SPECIFIC DATA REPORT

EPA Reg. No. ______________________ Date ______________________________

Guidance Document for ____

Registration Guideline No.	Name of Test	Test not required for my product listed above (check below)	I am complying with data requirements by: Citing MRID Number or EPA Accession Number	I am complying with data requirements by: Submitting Data (Attached)	(For EPA Use Only) Accession Numbers Assigned
§158.120 PRODUCT CHEMISTRY					
61-1	Identity of ingredients				
61-2	Statement of composition				
61-3	Discussion of formation of ingredients				
62-1	Preliminary analysis				
62-2	Certification of limits				
62-3	Analytical methods for enforcement limits				
63-2	Color				
63-3	Physical state				
63-4	Odor				
63-5	Melting point				
63-6	Boiling point				
63-7	Density, bulk-density, or specific gravity				
63-8	Solubility				
63-9	Vapor pressure				
63-10	Dissociation constant				
63-11	Octanol/water partition coefficient				
63-12	pH				

Registration Guideline No.	Name of Test	Test not required for my product listed above (check below)	I am complying with data requirements by		(For EPA Use Only) Accession Numbers Assigned
			Citing MRID Number or EPA Accession Number	Submitting Data (Attached)	
63-13	Stability				
63-14	Oxidizing/reducing reaction				
63-15	Flammability				
63-16	Explodability				
63-17	Storage stability				
63-18	Viscosity				
63-19	Miscibility				
63-20	Corrosion characteristics				
63-21	Dielectric breakdown voltage				
§158.135 TOXICOLOGY					
81-1	Acute oral toxicity, rat				
81-2	Acute dermal toxicity, rabbit				
81-3	Acute inhalation, toxicity, rat				
81-4	Primary eye irritation, rabbit				
81-5	Primary dermal irritation				
81-6	Dermal sensitization				

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FORMULATOR'S EXEMPTION STATEMENT
(40 CFR 152.85)

EPA File Symbol/Reg. No. ______________ Product Name ______________________

Applicant's Name and Address ____

____

____

____

As an authorized representative of the applicant for registration of the product identified above, I hereby certify that:

(1) This product contains the active ingredient(s): ____________

____

____

(2) Each active ingredient listed in paragraph (1) is present solely as the result of the incorporation into the product (during formulation or packaging) of another product which contains that active ingredient, which is registered under FIFRA sec. 3, and which is purchased by us from another producer.

(3) Indicate by circling (A) or (B) below which paragraph applies:

(A) An accurate Confidential Statement of Formula (EPA Form 8570-4) for the above identified product is attached to this statement. That formula statement indicates, by company name, registration number and product name, the source of the active ingredient(s) listed in paragraph (1).

OR

(B) The Confidential Statement of Formula dated _________ on file with the EPA is complete, current and accurate and contains the information required on the current CSF Form No. 8570-4. The registered source(s) of the active ingredient(s) listed in paragraph (1) is/are listed below:

Active ingredient	Source: Product name and Reg. No.

Signature ______________________________

Date ______________ Title ______________________________